

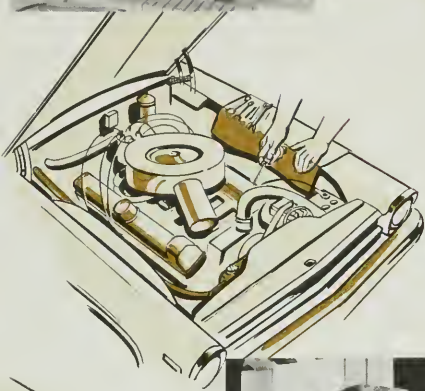
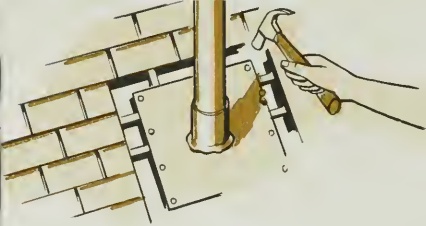
Science &
Mechanics

Complete
**HANDYMAN
ENCYCLOPEDIA**

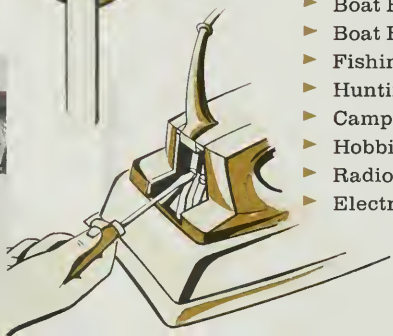
21
WIND GAUGE
INDEX

do-it-yourself

Complete
Handyman
do-it-yourself
Encyclopedia



do-it-



- ▶ Home Modernizing
- ▶ Home Repair and Improvement
- ▶ Auto Repair and Maintenance
- ▶ Appliance Repair
- ▶ Furniture Building
- ▶ Interior Home Projects
- ▶ Exterior Craft Projects
- ▶ Gardening
- ▶ Use of Hand and Power Tools
- ▶ Boat Building
- ▶ Boat Handling
- ▶ Fishing and Fishing Equipment
- ▶ Hunting and Hunting Equipment
- ▶ Camping and Camping Equipment
- ▶ Hobbies and Crafts
- ▶ Radio, TV and Electronics
- ▶ Electrical Installation

Complete Handyman yourself Encyclopedia

A COMPILATION OF NEW AND PREVIOUSLY PUBLISHED SPECIAL
INTEREST PROJECTS AND MANUALS FOR THE
REPAIR AND CARE OF HOMES, AUTO,
APPLIANCES, HOBBY EQUIPMENT.
by the editors of

**Science &
Mechanics**

21

WIND GAUGE
INDEX

H. S. STUTTMAN INC. *publishers*

Westport, CT. 06889

COPYRIGHT © 1975, 1978, 1983 BY
H. S. STUTTMAN INC.

ISBN 0-87475-725-8
Library of Congress Catalog No. 74-21375

No part of the text or illustrations in this compilation may be reproduced without written permission. Manuscripts were produced by DAVIS PUBLICATIONS, INC.

All instructions and diagrams have been checked for accuracy. However, success and safety in working with tools depend on individual accuracy, care, caution and skill. For this reason, the authors and publishers cannot guarantee the result of any project, nor assume responsibility for damage to property or injury to persons. In using any tools, building any projects, or carrying out any procedures, persons do so entirely at their own risk.

PRINTED IN THE UNITED STATES OF AMERICA

ZOP (750) 20R-541

VOLUME 21

WIND GAUGE

MEASURE WIND SPEED WITH AN ANEMOMETER: Cost of building this instrument is low. Its performance is equal to that of equipment costing four times as much 3087

WINDMILL

HARNESSING WIND POWER FOR HOME ENERGY: Wind is free, but using it to generate energy for a home requires expenditure of both time and money...so here are some tips to guide your selection and use of a personal windmill to save on home energy costs 3100

WINDOW REPAIR

HOW TO REBUILD WINDOWS THE EASY WAY: You can replace loose, rattling window channels with new vinyl-clad metal ones inexpensively. The job takes about one hour per window 3104

WINDOWS

SOLVING PROBLEMS IN WINDOWS AND DOORS: Most difficulties with the windows and doors of your home can be solved easily. Use these tips to make them function properly and cut your heating bills 3106

HOW TO INSTALL DOUBLE-PANE INSULATING WINDOWS: Two thicknesses of glass sealed with an air space between them will keep the heat in your house and the cold out. They cost little more than storm windows, if you install them yourself. 3110

WINE CELLAR

COMBINATION BUFFET AND WINE CELLAR: This handsome mobile bar can be built of veneered plywood with simple hand tools 3114

WIRING, ELECTRICAL

HOW TO WORK SAFELY WITH ELECTRICITY: A few simple rules and keeping your mind on what you are doing can save you costly repairs of damage and prevent tragic accidents 3118

SAFE WIRING INDICATOR: With this easy-to-build gadget, you will know for sure if your three-wire outlet is safe 3123

HOW TO REWIRE OLD LAMPS: Frayed cords and loose sockets are dangerous, but repairing them is easy 3126

WIRING AN EXTRA ROOM: Most of the cost of electrical wiring goes to pay the electrician. The cost of the wire, switches, outlets and other fixtures is relatively little. If you install them yourself, you can pocket the difference 3129

WOOD BENDING

HOW THE EXPERTS BEND WOOD: Use these professional tricks to make sharp curves or spiral bends in wood 3139

WOODWORKING

- HOW TO FINISH EDGES AND END GRAINS:** The edges and end grains of wood, especially plywood, present difficult problems, but you can solve them with these woodworkers' tips 3145
- THE BASICS OF DADOING AND RABBETING:** These techniques of joinery make strong joints, and with their variations, are widely used and simple to execute 3152
- ALL ABOUT JOINTS AND JOINERY:** How to make the type of glued joints that will strengthen and improve any woodworking project 3157
- MACHINE MOLDING OF FLAT STOCK:** How to make and use jigs, patterns and forms to mold stock on a shaper, drill press or power saw 3167

WORKBENCH

- BUILD YOUR OWN WORKBENCH:** You don't need a workshop full of equipment to build this sturdy, serviceable bench; just a few ordinary tools will do the job 3174
- MAKE A MODERN MULTI-PURPOSE WORKBENCH:** This carefully designed bench packs a lot of versatility into a small space 3182
- HOBBYIST'S LOW-VOLTAGE POWER SUPPLY:** This handy device is simple, but performs a variety of useful tasks 3196

WORKSHOP

- HOW TO LAY OUT YOUR WORKSHOP:** No matter how much or how little space you have to work with, there is an efficient way to arrange your tools 3198
- WALL-MOUNTED WORKSHOP DESK:** This handy shop cabinet with a fold-down reading surface can stand on a table top or be mounted on the wall 3202

YARN

- HOW TO DECORATE WITH FELT AND YARN:** Techniques you can use to make impressive wall hangings, pillows or purses 3205

ANATOMY OF A HOUSE

- STRUCTURAL TRANSPARENCIES** facing page 3208

- INDEX** 3209

Measure Wind Speed with an Anemometer

**Cost of building this
instrument is low.
Its performance is equal to
that of equipment
costing four times as much**

THIS WIND SPEED GAUGE has an accuracy of 5% or better, and its cost is reasonable. Dual meter ranges cover 0-30 mph and 0-90 mph. Readout is indicated on a large, clear, easy-to-read meter scale. And its remote pickup head can be located up to 150 feet from the readout indicator.

It's low cost and high accuracy are achieved through use of two integrated circuits (ICs), which together replace 12 transistors and 24 resistors. A novel optical sensor in the remote pickup head speeds construction by replacing a more complicated mechanical design.

How it works. Whenever the wind blows, it revolves the wind cups. The remote pickup head, built into the housing that supports the wind cups, is a photoelectric pulse generator whose pulse rate is directly proportional to the speed of the wind. A disc, having holes punched uniformly around its edge, is fastened to the end of the shaft opposite the wind cups. Mounted above this disc is a light source that shines through the perforations into a variable-resistance photocell positioned below the



3088

disc directly under the light source (the disc is sandwiched between the light source and the photocell).

When the wind blows, the cups rotate the shaft, which, in turn, rotates the perforated disc. This allows light to alternately shine through to, and to be cut off from, the photocell. Each time light strikes the cell, its resistance drops sharply. The photocell and resistor R3 form a voltage divider across the power source. When the resistance of the photocell is momentarily reduced by excitation from the light source, the voltage in that part of the divider is reduced. A pulse results from the sharp increase in current and resultant voltage drop.

This pulse triggers the hex inverter (IC1) which shapes and amplifies the pulse sig-

Measure Wind Speed with an Anemometer

nals appearing across the voltage divider. The first inverter of IC1, biased by resistor R4, operates as a class-A amplifier. Succeeding stages are connected in cascade and operate with no bias. This considerably improves the input pulse rise and fall time that is necessary for accurate performance. A small amount of positive feedback in stages 4 and 5 further improves the rise and fall time of the pulses. Capacitor C3 on the input acts as a high-frequency filter, eliminating false triggering that could be created by spurious signals picked up in the long lead line.

Stages 3, 4, and 5 of the IC are wired as a one-shot multivibrator that is triggered by the shaped and amplified pulses from the previous stages.

The sharp input pulses from IC1 are differentiated by capacitor C6 and resistor R5. The leading edge of the pulse triggers a constant-width, monostable multivibrator, formed by three of the inverters in IC2. Each time the one-shot multi is triggered, it flips from its stable state to an unstable state. The amount of time that it remains in his unstable state is determined by the values of resistance and capacitance in the coupling network. The on time is set by range selection capacitors C7 and C8, calibration control R6, and resistor R7. The output pulse from the one-shot multi is buffered and inverted by the remaining three inverters in IC2, which are connected in cascade (see schematic for ICs).

Protected meter. When the one-shot is triggered, the output at pin 7 from IC2 drops from 3.6-V, the supply voltage, to a mere few tenths of a volt. This effectively grounds the end of resistor R8 connected to the IC, and a pulse of current flows through meter M1. As the wind picks up speed, the one-shot is triggered more often,

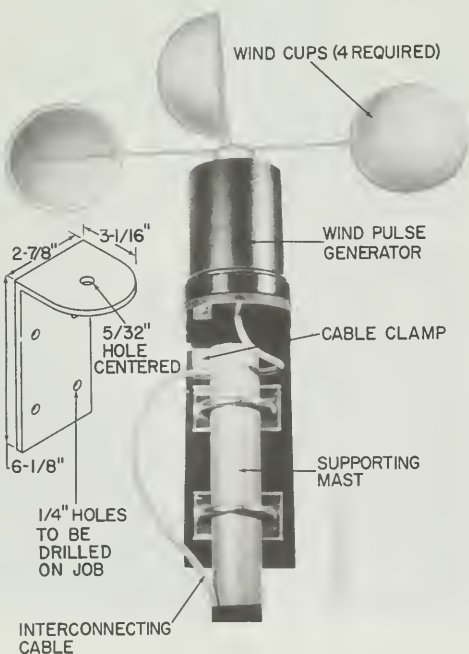


Photo shows how wind cup generator is fastened to its mounting mast. Also, details on making the mounting bracket are shown.

Measure Wind Speed with an Anemometer

3089



◀ How finger is used as a mandrel when punching holes in the polystyrene wind cups with a tool made by sharpening a piece of $\frac{1}{8}$ -inch brass tubing.

▼ Pointer shows where epoxy is placed to fasten wood cups to brass mounting rods.



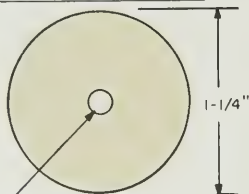
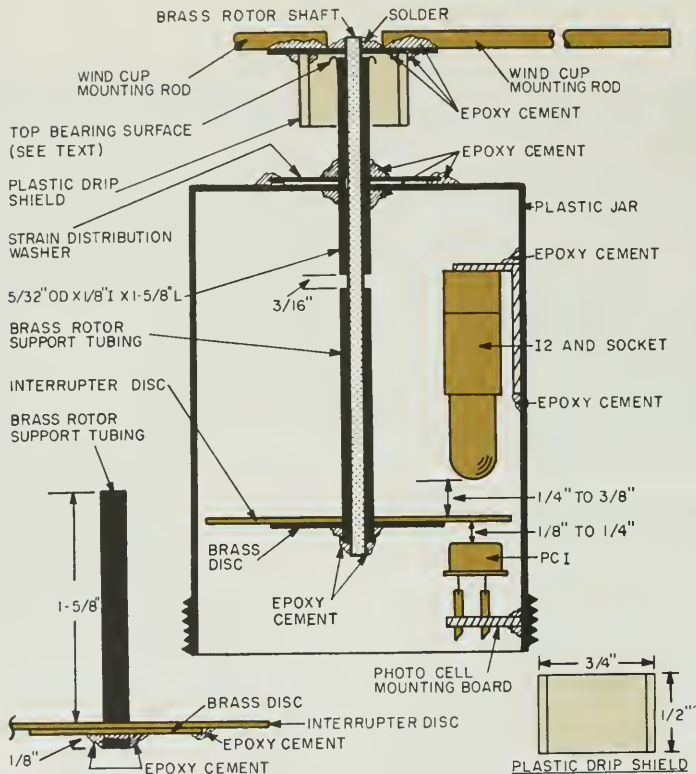
PARTS LIST—Pulse Generator

12	#755 single contact, miniature bayonet base, 6.3 V-0.15 A lamp bulb (Lafayette 32E69032 or equivalent)
P1	5-pin plug with hood and cable clamp (Amphenol 126-217 or equivalent)
PC1	Photocell, Clairex C L-703L
1	Miniature bayonet base, pilot lamp holder (Lafayette 37E28079 or equivalent)
1	2 $\frac{5}{8}$ x 3 $\frac{1}{2}$ -inch plastic jar with screw-on cover
1	2 $\frac{7}{8}$ x 9 $\frac{3}{4}$ x $\frac{1}{4}$ -inch plexiglas for mounting bracket (see text)
1	$\frac{3}{4}$ -inch OD, $\frac{5}{8}$ -inch ID x $\frac{1}{2}$ -inch long plastic tubing for rain drip shield
4	3-inch diameter light plastic half-hemispheres
4	Pieces $\frac{1}{8}$ -inch OD x 6-inch long brass tubing
1	Piece $\frac{3}{8}$ -inch OD, $\frac{1}{8}$ -inch ID x $\frac{1}{2}$ -inch long brass tubing
1	Piece $\frac{3}{8}$ -inch OD, $\frac{1}{8}$ -inch ID x $\frac{1}{4}$ -inch long brass tubing
3	$\frac{1}{2}$ -inch thick, half-hard brass discs, $\frac{1}{4}$ -inch OD (if discs not available, cut from sheet brass)
1	Bakelite disc $\frac{3}{8}$ -inch thick x $2\frac{1}{4}$ -inch diameter
1	2 x 1-inch piece perfboard
Misc.	Length as required (not to exceed 150 feet) Belden #8734 3-conductor cable with vinyl insulation and overall vinyl jacket (one conductor shielded), black spray paint, antenna mast mounting hardware (Lafayette 18E01950 or equivalent)

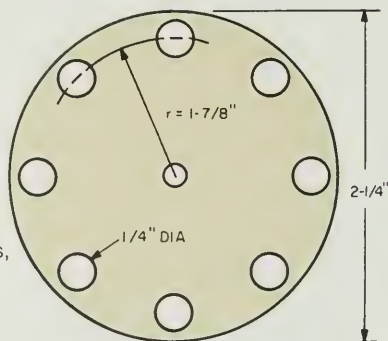
directly in proportion to the wind speed. The pulse rate increases, and meter M1 and capacitor C9 integrate the output pulses into a wind speed reading. Should the voltage across the meter exceed 0.6-volt, diode D6 conducts, shunting current around the meter and protecting it from overload.

A Zener diode regulated power supply provides + 3.6-VDC power for the instrument. Output from the secondary of transformer T1 is rectified by a fullwave bridge rectifier consisting of diodes D1 through D4. Capacitor C1 brute-force filters the rectified output; Zener diode D6 holds the voltage on the base of transistor Q1 at 4.2-V. Since transistor Q1 is connected as an emitter follower, the filtered DC output appears on Q1's emitter. Low-voltage AC power to operate exciter lamp I2 is pro-

WIND CUP PULSE GENERATOR



MAKE 3 DISCS; 2 WITH 5/32" DIA HOLES,
1 WITH 1/8" DIA HOLE;



Illustrated here are construction details for the wind cup generator. Though not shown in the drawing, leads from lamp 12 must be tacked to side wall of jar to keep them away from the rotor disc, to prevent disc binding.

Measure Wind Speed with an Anemometer

vied by the 6.3-V secondary winding of the power transformer.

Construction tips. Before starting the actual fabrication of the various units, it is suggested you study the photos and illustrations to familiarize yourself with the basic units, how they were constructed, and their relationship to one another. Take into account the dimensions shown in relation to materials you have readily available. It may be necessary for you to compromise somewhat in order to use available sources.

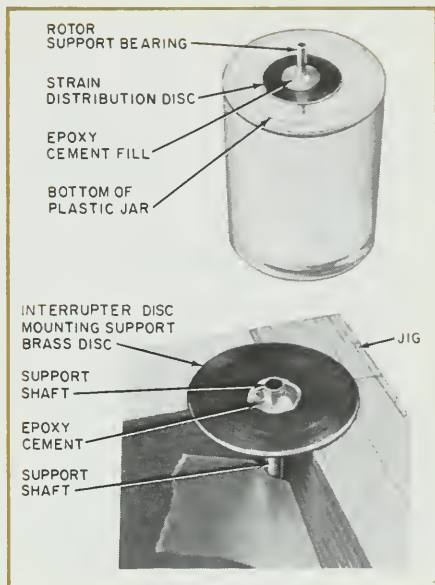
Epoxy cement contributes a great deal to the building of this instrument. In order to receive the most benefits from epoxy cements, the resin and the hardener must be thoroughly mixed as quickly as possible. Try to use the 5-minute curing epoxies; they'll speed up the waiting time.

The remote pickup head, which actually is a wind cup pulse generator, is housed in a small plastic jar, preferably one with a screw-type cover. To ensure that no extraneous light reaches the photocell, we recommend that you spray the jar and its cover with several coats of flat black paint to completely opaque it. (We purposely did our painting after completion of construction in order that details in construction would show-up better in our photos.)

Drill a $\frac{3}{32}$ -inch hole in the lid of the jar to permit the lead cable to exit from the jar. Also drill the same size hole in the exact center of the bottom of the jar.

You'll need three discs made from $\frac{1}{32}$ -inch thick half-hard brass. The outside diameter of the discs is $1\frac{1}{4}$ inches. Two should have a $\frac{3}{32}$ -inch hole drilled at the exact center; the remaining one should have a $\frac{1}{8}$ -inch diameter hole drilled in its center. One of the discs with a $\frac{3}{32}$ -inch hole serves as a strain distribution washer. The center holes in the strain washer and the bottom of the cup must be aligned to permit bearing support tubing to pass through both easily for free shaft rotation.

Prepare the bearing support tubing, made



from a $1\frac{5}{8}$ -inch length of $\frac{5}{32}$ -inch OD, $\frac{1}{8}$ -inch ID brass tubing for mounting in the base of the cup. It's important that the inner and outer surface of one end of this piece of tubing be as smooth as possible, since these surfaces are top bearing surfaces. The tubing should be chucked in a slow-speed drill (400-600 rpm) and smoothed both on inner and outer surfaces with a fine needle file. Bring the file against the rotating tubing to create a smoothed radius on one end.

It cannot be emphasized too strongly the importance of a smooth surface for the bearing support tubing. Rough spots at this point can create future trouble either by slowing down the rotor because whatever produced the rough spot gouged the surface of the support bearing disc or, perhaps, when the atmosphere is quite humid and the temperature drops suddenly, the

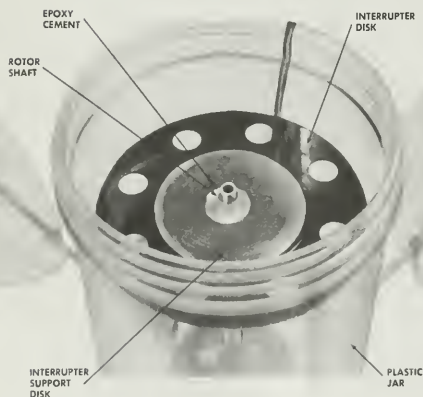
moisture trapped between the gouge in the disc and the bearing support tubing freezes and stops the rotor completely.

Cement this bearing support tubing in position to the bottom of the plastic jar with a blob of epoxy spread uniformly around the tubing both inside and outside the plastic jar to give added support to the bearing. The end of the tubing with the smoothed radius should protrude $\frac{5}{8}$ -inch beyond the strain distribution washer.

The interrupter disc. This disc is made from thin, rigid plastic sheet. If not opaque, spray it with flat black paint after cutting to size and punching holes in it. Punch eight $\frac{1}{4}$ -inch diameter holes in the disc, spaced uniformly around the circumference on a radius of $1\frac{1}{8}$ inches. Also drill a $\frac{5}{32}$ -inch hole in the exact center of the disc.

At this point make a jig from two pieces of wood, at least $\frac{3}{4}$ -inch thick by $3\frac{1}{2}$ inches wide, fastened at right angles. This jig is used to assure proper alignment of the interrupter disc on its bearing disc to the rotor shaft.

▼ After installing 12, interrupter disc is held $\frac{1}{8}$ -inch from bottom of rotor shaft and cemented with epoxy to the rotor shaft.



Measure Wind Speed with an Anemometer

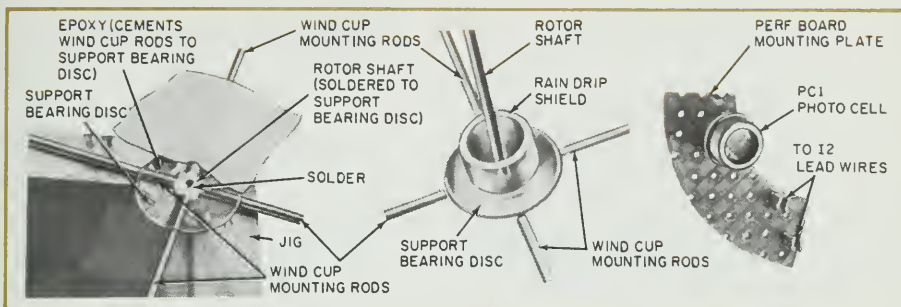
Insert a $1\frac{3}{4}$ -inch long x $\frac{5}{32}$ -inch OD, $\frac{1}{8}$ -inch ID piece of brass tubing into the center hole of the plastic disc so that it protrudes $\frac{1}{8}$ -inch beyond the outer surface of the interrupter disc. Temporarily fasten the tubing with masking tape to the jig as shown in the photo. Next, epoxy one of the brass discs to the interrupter disc and cement both the perforated plastic interrupter and brass discs to the brass support tubing, spreading the epoxy uniformly around the tubing.

Rotor shaft. A good time to prepare the rotor shaft is while the epoxy cement for the interrupter disc assembly is curing. It is made from a $3\frac{3}{16}$ -inch length of brass tubing $\frac{1}{8}$ -inch OD. Check it for trueness and fit in the bearing support tubing previously epoxied in the plastic jar. The rotor must fit inside the bearing tubing snugly, but must still rotate freely in it.

Four lengths of brass tubing $\frac{1}{8}$ -inch OD by 6 inches long serve as support arms for the four wind cups. These arms are epoxy cemented to the top of the bearing support disc at right angles to one another. One end of each of the rods should be $\frac{5}{16}$ -inch from the center line of the rotor shaft to leave a clear area so that rotor shaft can be soldered to the disc. For balance it's important that the arms are each separated by 90° . You should use a protractor to double-check this placement.

As soon as epoxy on the interrupter disc assembly has cured, the jig can be freed for proper alignment of the rotor when fastening the rotor shaft to the brass support bearing disc. Solder the brass rotor shaft to the brass disc, employing the jig to ensure accurate alignment. Be careful not to bend wind cup mounting rods.

The rotor shaft assembly and the interrupter disc assembly are now ready to be mounted in the plastic jar. But first, a lamp holder, to which a pair of leads has been soldered, must be epoxied inside the plastic jar. At this stage you should also prepare

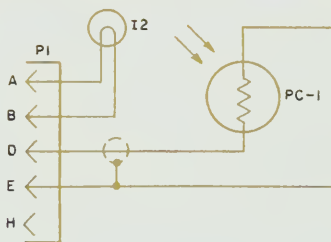


a mounting board on which the photocell and terminals for the cable between the wind generator and the indicator are installed. The lead wires from the photocell and to the exciter lamp are contained in this cable.

Make the photocell terminal mounting board from a piece of perfboard cut into a truncated pie section having an outside radius of $1\frac{1}{4}$ inches and an inside radius of $\frac{3}{4}$ -inch. Overall length of the board should be $1\frac{1}{2}$ inches and it should be $\frac{1}{2}$ -inch wide. The photocell is mounted on push-in terminals. Terminal points between the lamp and photocell leads and the lead cable to the indicator are also push-in terminals.

Cement a rain shield, which is a $\frac{1}{2}$ -inch length of plastic tubing having $\frac{3}{8}$ -inch ID x $\frac{5}{8}$ -inch OD, to the bottom of the brass support bearing disc. It should be positioned concentric to the disc, as shown in photo.

Assembly of pulse generator. Before final assembly, it's best to insert the lamp in its socket and test it to be sure it's working. Once the assembly has been completed, it will be difficult to reach the bulb. For this reason we've specified the 50,000-hour long life bulb instead of an electrically interchangeable ± 47 pilot lamp, which doesn't claim anywhere near that length of life before burnout.

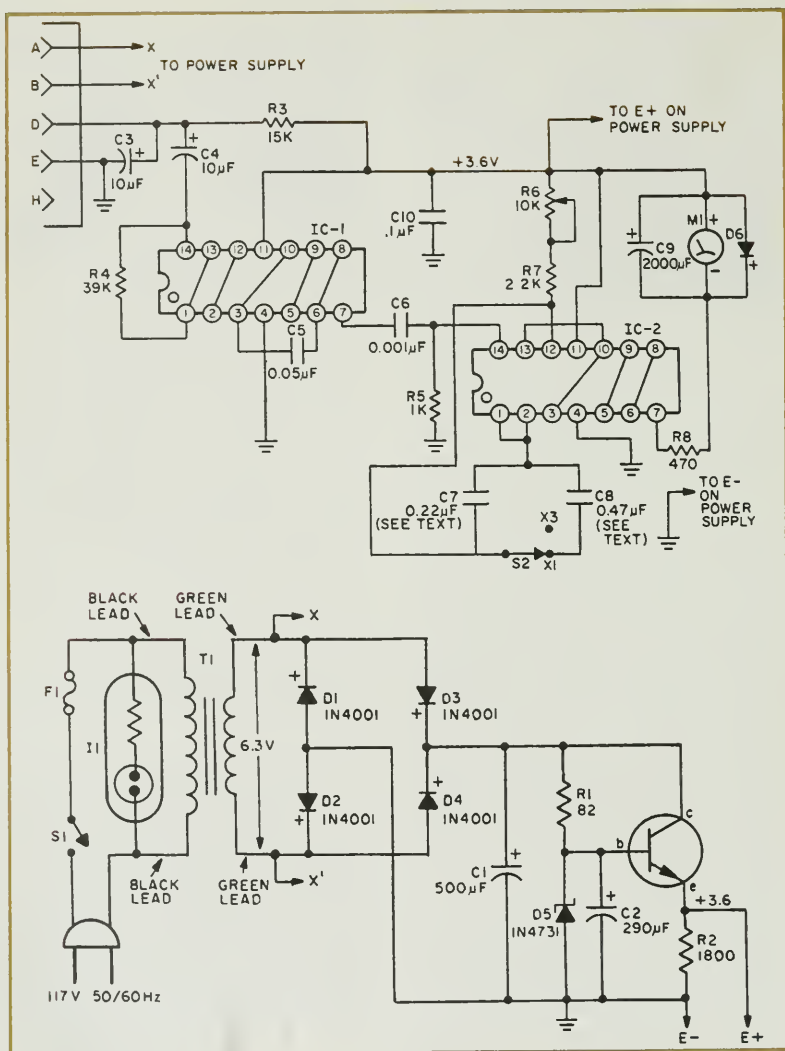


▲ Schematic for wind cup generator. Cable may be extended to 150 feet.

At this stage opaque the housing with dark spray paint if your plastic jar requires it.

Silicone grease, the type used in heat-sinking power transistors, will prevent freeze-up when the temperature drops and will also provide lubrication to allow the rotor to turn with little resistance. Place a pea-sized dab on the bearing surface of the support bearing disc. This lubricant should be applied each year before the start of cold weather.

Final assembly. Insert the rotor assembly into the support bearing tube in generator housing. Now invert the housing and slip the interrupter disc assembly, with its support tubing, over the rotor so that the end of the support tube rides $\frac{1}{8}$ -inch below the end of the rotor shaft. Use a single drop of



▲ The schematic at the top details the circuit for the indicator unit, except for its power supply. The diagram shows proper orientation for the IC's, looking down on them. The lower diagram details the power supply, which employs a 4.2 v Zener diode to regulate the output voltage that energizes the indicator unit electronics circuit.

PARTS LIST—Indicator

C1	500-uf, 15-VDC electrolytic capacitor (Sprague TVA1162 or equivalent)
C2	290-uf, 12-VDC electrolytic capacitor (Sprague TE1139 or equivalent)
C3, C4	10-uf, 15-VDC electrolytic capacitor (Sprague TE1155 or equivalent)
C5	0.05-uf, 12-VDC ceramic (Erie 5635-000 Y5FD-503M or equivalent)
C6	0.001-uf, 100-VDC ceramic capacitor (Erie 801-000X5FD102K or equivalent)
C7	0.22-uf, 12-VDC ceramic capacitor (Erie 5615-000Y5FD224M or equivalent)
C8	0.47-uf, 200-VDC capacitor (Aerovox V1462-134 or equivalent)
C9	2000-uf, 25-VDC electrolytic capacitor (Cornell Dubilier BR2000-25 or equivalent)
C10	0.1 uF, 12VDC ceramic capacitor (Erie 5655-000-Y5F0-104M)
D1, D2, D3, D4	1N40001 silicon diode, 50 PIV, 1 A
D5	1N4731 Zener diode, 4.2 volt, 1 watt, 10% tolerance
F1	Fuse, type 3AG, 1/4 A
I1	Neon pilot lamp assembly, amber lens caps (Lafayette 34E52174 or equivalent)
IC1, IC2	Integrated circuit, hex inverter (Motorola MC789P00 HEP-573)
J1	5-pin chassis socket (Amphenol 126-218 or equivalent)
M1	0-1 mA meter (3 x 4 1/2-inch) 100 ohms or less coil resistance (see text)
Q1	Npn silicon transistor, type 2N697
R1	82-ohm, 1/2-watt resistor
R2	1800-ohm, 1/2-watt resistor
R3	15,000-ohm, 1/2-watt resistor
R4	39,000-ohm, 1/2-watt resistor
R5	1000-ohm, 1/2-watt resistor
R6	10,000-ohm, PC board mounted miniature potentiometer (Mallory MTC1L41 or equivalent)
R7	2200-ohm, 1/2-watt resistor
R8	470-ohm, 1/2-watt resistor
S1, S2	Spst rocker type switch (Cutler Hammer 8144K21A1M52 or equivalent)
T1	Low voltage power transformer; primary 117 V, 50/60 Hz, secondary 6.3 VAC at 0.6 A (Stancor D6465 or equivalent)

Aluminum minibox 4 x 5 x 6-inch (Lafayette 12E83746 or equivalent—see text)

Dual fuse holder, 1 active, 1 spare (Lafayette 99E63372)

Perfboard 0.2 holes on 0.1-inch grid pattern (Lafayette 19E83584 or equivalent)

Heat sink for Q1 (Wakefield NF-209)

2 Sockets for ICs (Lafayette 47A2152 or equivalent—optional, see text)

Misc. Transfer letters, bolts, nuts, hardware, push-in terminals and eyelets, pressure sensitive vinyl finishing material, 5-minute curing epoxy, RTV Silicone Seal, rubber feet, AC line cord, wire, solder, etc.

epoxy to cement the support tube to the rotor shaft. If you located the lamp socket correctly within the generator housing, the lamp bulb should clear the interrupter disc by 1/4- to 3/8-inch when the housing is positioned so that the interrupter disc faces down. In this position you should note about 3/16-inch up-and-down play in the rotor shaft.

With the photocell mounted in position on its circuit board, cement this assembly inside the generator housing directly below the lamp so that the space between the bottom of the housing and the circuit board is 3/16-inch. The lead cable will be connected and the cover of the jar fastened in position after the wind cups have been epoxied in position. The reason for this is that the jar can rest on the bench during this assembly if the wire is not in position at this time.

Wind cups. We made the wind cups from thin, styrene plastic, half spheres, 3 inches in diameter. You may use smaller ones, but no smaller than 2 1/2 inches in diameter. Regardless of the diameter of the wind cups, the center-to-center spacing should not be changed, since this would affect overall calibration of the instrument.

Make a punch by sharpening one end of a scrap of 1/4-inch diameter brass tubing, for punching the holes in the plastic hemispheres, as shown in the photo. The cups should be epoxied to their respective lengths

3096

of 1/8-inch OD tubing, positioned as shown in the photos.

Mounting bracket. The mounting bracket for the completed wind cup pulse generator unit can be made from plastic, from metal (iron or aluminum), or from wood.

If you use plastic, make the 90° bend by gently heating the plastic with a small butane torch, being careful not to touch it with the flame. When the plastic softens and becomes pliable, form it over a right-angled block. Keep the material in position over the block until it has cooled down, at which time it will be rigid. If wood is used, the bracket is formed by nailing two pieces of wood together at right angles in the shape of the bracket shown in the photos. Metal is formed either in a brake or a bench vise.

Epoxy cement the plastic jar cap to the bracket so that the jar containing the pulse generator and wind cups can be screwed into the jar cap, thus holding it in position. Drill a hole in the bracket to permit the lead wires from the generator assembly to feed out of the jar.

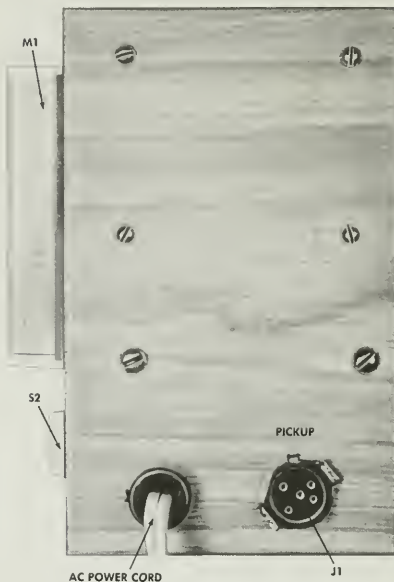
The indicator. The major mechanical construction is complete now and the only remaining assembly work is the indicator unit, which contains the electronics.

Start by trimming a standard 6 x 5 x 4-inch minibox to a 6 x 5 x 3-inch dimension.

First step is to cut out the large round hole for the meter, and the rectangular holes for the rocker switches, and drill the hole for the pilot lamp, all on the front panel of the major half of the minibox. Also drill mounting holes for the power transformer, fuse holder, input jack, and AC cord on the right-hand side of the box and mounting holes for the circuit board on the left-hand side.

To cut the meter hole and the rectangular switch holes, use a hand nibbler, or, if one isn't available, drill a series of small holes very close together around the pe-

Measure Wind Speed with an Anemometer



▲ Right side of indicator unit shows location of J1, exit hole for power cord and mounting screws for T1 and fuse mounting board.

riphera of the main holes. Then knock out the large pieces of metal and file the edges smooth to the exact sizes and shapes required. Deburr all holes before assembly. Any 0-1 mA meter having a coil resistance of 100 ohms or less will work. Be sure you have enough room in the cabinet for the size meter you use.

Mount the fuse holder on a 2 x 2 1/2-inch piece of perfboard. The mounting screws for this board should be 4-40s at least 1/2-inch long so that the board can be held away from the metal box with extra locking nuts. The circuit board is mounted in the same way.

When all holes have been drilled cover the outer surface of the minibox with wood grained pressure-sensitive adhesive vinyl, to make an attractive-looking instrument.

Measure Wind Speed with an Anemometer

3097

A word of caution: when tightening mounting screws be sure to hold the heads of the screws rigid with a screwdriver and tighten mountings by using a socket wrench on the nuts; otherwise, the vinyl sheeting will be pulled and stretched by the bolt heads. Trim vinyl around the holes with a razor blade before mounting components.

To make your project really professional looking, letter the controls with press-on letters. Spray lettering with several coats of clear acrylic for protection.

Electrical assembly. Most of the electronic circuit parts are mounted on the circuit board. We suggest you use G or P pattern perfboards as the hole spacing matches the pin spacing of the ICs we used. The components are mounted flat on the board and push-in clips and/or eyelets are used to facilitate mounting and connecting. The leads of the ICs are pushed through the perfboard and bent outward against the board. This holds the IC in place and provides a tab to which leads are soldered. Inter-component wiring is made with #26

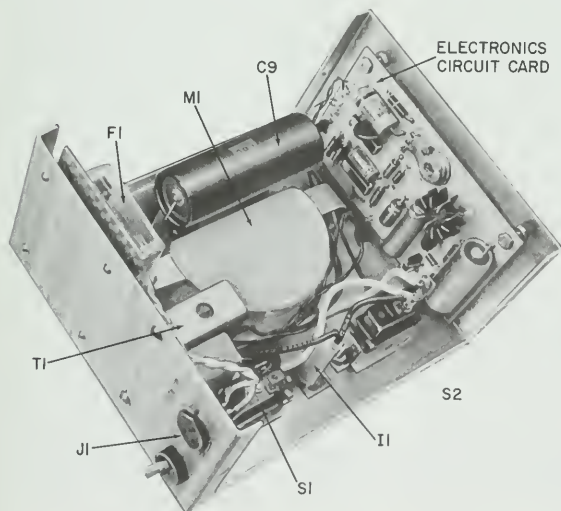
bare copper wire. Where wires cross over they are insulated with plastic tubing.

Wire the circuit card in accord with the schematic. Be sure electrolytic capacitors and diodes are properly polarized before soldering to them. Also make certain that the ICs are correctly positioned before you solder them in.

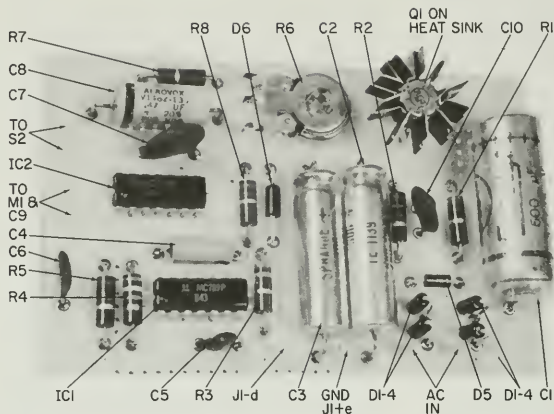
Alternate IC mounting. You may want to use a socket for the IC. As a matter of fact, the investment for a socket is well worth it. You solder to the socket, rather than to the IC, thus reducing the possibility of damaging the IC with excess heating. You also have the advantage of being able to plug in the IC for proper orientation and/or replacement should this be necessary.

Use an alligator clip temporarily clipped to a lead when soldering Q1 and the diodes. If you elect to solder in the ICs, you should use the heatsink on each of their leads, too.

The circuit card is mounted on the left side of the indicator housing with four 4-40 bolts and nuts so that the card is supported



◀ Photo shows the neat layout for the electronic components making up the indicator unit. The power supply is located on the right (except for diodes and capacitors), the electronics card is on the left side and meter and controls on front.



✦ The electronics circuit card is detailed here. Although the photo shows both C2 and C3 the same size, the author recommends C3 a 10 μF , 15V electrolytic.

away from the metal of the housing, as mentioned earlier. Inter-connect the vari-out components not part of the card except for the meter.

Meter modification. Any 0-1 mA meter having a coil resistance of under 100 ohms can be used for M1. However, the meter scale will have to be changed from 0-1 mA calibrations to 0-30 mph. You can just turn it over and spray it with flat white. To mark the scale, use press-on letters.

Checking it out. Plug in the remote pulse generator, turn on the AC power, and give the rotor a spin. If all has gone well you should get an indication on the meter. Check both ranges (X1 and X3).

If nothing happens, start out by checking all wiring for possible glitches, cold soldered joints, shorts between pins of ICs and transistor Q1, etc. See if + 3.6-V is present on pin 11 of both ICs. Also check to see if the exciter lamp in the pulse generator is lit. Double check the polarity of all electrolytics and diodes and also check to be sure the ICs are oriented correctly.

Calibration. When you get an indication on the meter by rotating the wind cups, the meter reading in the X1 position should be three times the reading in the X3 position

for a given speed of the rotor. While maintaining rotor speed by hand, switch back and forth to determine if meter readings are correct.

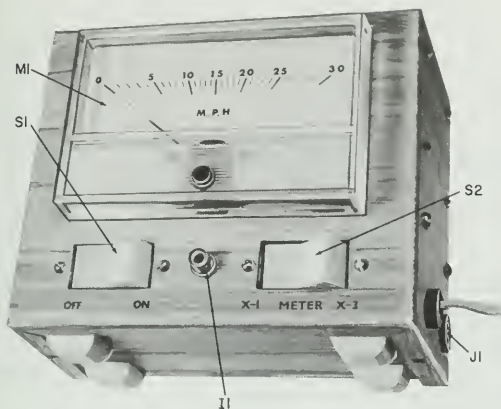
Tracking between these two ranges is dependent on the capacities of C7 and C8. The capacitance of C7 should be exactly half that of C8. Since capacitors can vary as much as $\pm 20\%$ or more from the nominal value indicated on them and still are considered commercially acceptable, you should check their capacitance on a bridge if at all possible. If not, you can trim them by adding small capacitors until the desired meter range is reached.

To do this, turn the rotor by hand to produce a reading of 15 mph in the X1 range. If the reading drops below 5 mph in the X3 range add capacitance in small increments until it reads 5 mph. If it indicates more than 5 mph, add capacitance to C8. Add capacitance in steps of 0.01 μF or 0.02 μF to align the two ranges.

Adjusting meter reading. Once the proper range tracking has been established, probably the easiest way to complete the calibration is to do it in your car where you have a reasonably accurate speedometer to serve as a calibration standard. Unless you

Measure Wind Speed with an Anemometer

3099



◀ Note the clean long scale of the meter used to make it easy to read calibrations. Also note rubber feet on bottom. Rocker type switches used for ranging and on/off control are easy to operate.

happen to have a car with a 6-V battery (very rare these days—most use 12-V batteries) you will need 6-VDC, either from 4-D cells in series, or a 6-V lantern battery. Disconnect one side of T1 and bring out a pair of leads, one of which is connected to the indicator's ground and the other to the collector of Q1. The ground lead is connected to the negative and the collector lead to the positive of the 6-VDC source.

Also remove the leads connected to X and X1 on the secondary of T1. Connect a pair of leads between pins A and B of J1 and the external battery. This provides current to light exciter lamp when operating the instrument from an external DC power source while calibrating in a car ride. Once the calibration has been completed, remember to restore this modified wiring to its original condition as well as the modification to the battery wiring.

You'll need a friend, either to drive the car while you make adjustments or to make the adjustments for you while you drive. Calibration should be done on a calm, windless day if at all possible. Should there be a light breeze you'll have to average the calibration by checking readings obtained by driving in both directions.

With the car traveling at 30 mph (according to its speedometer) and the indicator set on X1 range, adjust R6 until the meter reads 30 mph. This is the only calibration necessary as you have already corrected the ranging, as previously mentioned. (Of course you've temporarily mounted the wind cup pulse generator outside the car so as to be in the wind's stream.)

Installation. Now that the instrument has been built and calibrated, where is the best location for the remote wind cup pulse generator to give a true indication of wind speed?

The pulse generator unit should be mounted 5 to 10 feet above the building on which it's being used. It should not be mounted in the lee of a taller building and the arms of the rotor should remain level as they rotate.

We recommend that easily-available TV antenna mounting hardware (e.g., mast clamps, mast mounting base, etc.) be used to mount the remote unit above the roof of the building.

Lubricant recommended isn't affected by temperatures below 0° F. E.A.M.

See also: ELECTRONICS; SCIENCE PROJECTS; WEATHER.

Harnessing Wind Power for Home Energy

Wind is free, but using it to generate energy for a home requires expenditure of both time and money . . . so here are some tips to guide your selection and use of a personal windmill to save on home energy costs

AS ENERGY COSTS CLIMB ever higher, home owners in rural or semirural areas are increasingly intrigued by the idea of building windmills to reduce or avoid utility bills. Many have found such wind power to be a blessing, while others have only lost money because of inadequately researched projects. There is much more to setting up a windmill than buying the best affordable wind machine and paying professionals to erect it.

Before sending for literature describing available windmill kits, check local zoning regulations and other legal avenues to anticipate problems you might encounter.

Your town and county may have stringent zoning regulations that may rule out the erection of a windmill on your property unless you can win a variance. The maximum allowable structural height may make a windmill impractical, and there may be specific requirements relating to type of architecture, choice of construction materials, electrical and plumbing requirements, and the need of a safety fence to

prevent curious people—especially children—from climbing onto the structure or even getting close to it.

Watch out for not-so-obvious restrictions. For example, you might plan to use a windmill only to pump water from your own underground aquifer. But windmill experts caution that in some areas the local municipal water company has a right to put a meter on your pump and bill you for water pumped from the ground at your own cost! If this applies in your area, know in advance whether you are willing to engage in a legal battle with the water company if you are unable to obtain a signed release from such unfair requirements.

You must also anticipate the rights of neighbors who might object to a windmill on aesthetic or other grounds. But you should also protect your own future rights. If there is any possibility that your wind might one day be cut off by erection of a large building or the growth of trees, it might be wise to seek an easement before spending money on a windmill.

Harnessing Wind Power for Home Energy

3101

Your next problem is to determine whether you have enough wind to efficiently operate the desired type of windmill. Do not rely on old-timers who claim to know how steadily and how hard the wind blows; they are likely to be very wrong in their wind-strength estimates. Wet finger measurements are worse than useless.

The best approach is to use an anemometer to actually measure wind strength *and* fluctuations for at least a full year to account for seasonal variations. Or you can take readings for a few months, then see if your data correlate with that recorded by a local weather bureau or airport.

Or you can adopt a less accurate arm-chair approach by estimating how well

wind flow across your property might reflect local area averages as recorded by the National Weather Service.

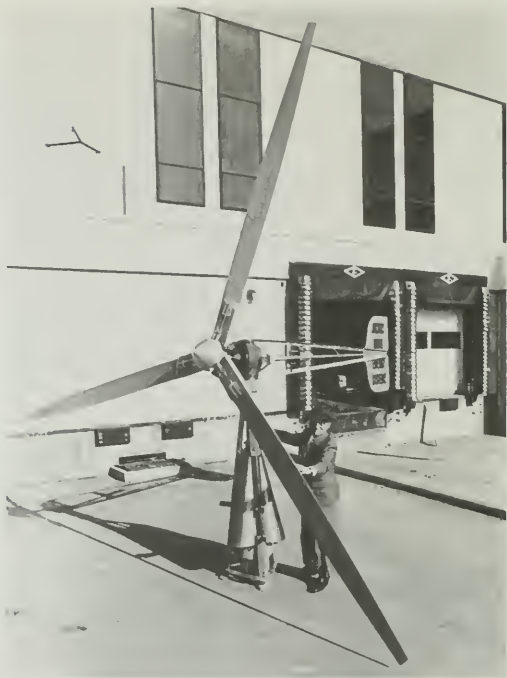
Obviously, the wind does not blow with equal force throughout the year, and in fact, frequently there may be no wind at all. You must decide whether windmill-generated energy should be stored for those lull periods, or whether you will switch to other (commercial) sources of energy when the wind fails to blow.

If the windmill is used to generate electricity, batteries can be used to store extra energy. If the windmill is used only for pumping water, extra water can be stored in a convenient reservoir (elevated tank or pond) from which it can be drawn off by



➤ The Entertech 1800 windmill was specifically designed for homeowners wishing to produce up to 60 percent of electrical needs from wind. Induction generator produces 115-volt 60-cycle AC current at all operating wind speeds. Power can be connected directly to 30-ampere AC home electrical circuit. Any surplus electricity generated flows out to local utility network.

➤ Jacobs 10-kilowatt wind energy system features variable pitch propeller speed control, completely automatic voltage and charging regulation. Storm protection is obtained by folding powerhead and inclined gear box around to side of tower in 40 mph or stronger winds. Tens of thousands of smaller 2,000- to 3,000-watt windmills have been sold world wide since 1930.



gravity flow as needed. But remember that the higher the water must be lifted initially, the more wind power is needed.

Wind power might be used to generate heat, for warming your home, barn or other structures. Excess heat can be stored in a rock bin or other type of storage facility commonly used in solar heating systems.

Incidentally, if your windmill generates a significant excess of electrical energy, it may be possible to deposit that excess into the local utility electrical energy bank (by reverse metering) and draw it back again as needed.

Choosing the best windmill for your needs can be a difficult task because of the proliferation of basic designs and power-

generating capacities. You should read enough about windmills in general to understand, for example, the differences between windmills that operate by virtue of *drag forces* and others that depend instead on *aerodynamic lift forces*.

For an excellent description of different types of windmills, as well as for a wealth of information about all aspects of setting up a windmill, consult *The Wind Power Book* by Jack Park.

Understand the differences between the following four basic types of practical windmills: Savonius, Darrieus, multi-bladed farm windmills, and high-speed propeller-type rotors. The type to choose depends upon the anticipated application.

Savonius (S-rotor) drag-type windmills look not at all like traditional windmills. They are constructed from such things as used oil drums and often look like several small water tanks piled one atop the other.

Their primary virtues include low cost, ease of construction, and high starting torques for starting under heavy loads such as are encountered in pumping water or other direct mechanical applications. One drawback is difficulty of designing an efficient braking system to slow down action during high winds.

Darrieus rotors are aerodynamic air-lift devices of several designs. The much publicized "eggbeater" windmill, so called because of its uniquely curved (looped) blades, is but one version. Another style features straight vertical blades whose pitch angle is changed automatically.

A Darrieus rotor is much more efficient than is a Savonius rotor because the blades actually move faster than the impelling wind. Darrieus rotors are suitable for driving such high-speed devices as electric generators, but ill-suited for water pumping and other applications requiring high starting torques. In fact, external power must usually be applied to a Darrieus rotor to bring it up to operating speed.

Multi-blade farm windmills have been in use since the middle of the last century, especially for pumping water. The closely spaced blades create a cascade wind effect that helps increase the windmill's efficiency.

These strong, relatively inexpensive windmills are easy to control (as by simply tilting the blade section up to protect the blades against damage by very heavy winds), and are ideal for high-torque applications. They are not best, however, for high-speed applications such as electric power generation.

High-speed rotors usually have two or three aerodynamically designed blades that provide the high speeds needed to efficiently drive electric generators. Although

towers need not be as rugged as for other types of windmills, the blades must be carefully designed to minimize vibration problems. Also, these high-speed rotors have low starting torques, and may require external boosting to get them started.

Whatever style of wind machine you choose, make realistic estimates of both the initial investment and long-term operating costs. If you find two or more comparable windmills available at significantly different prices, there's a temptation to opt for the bargain-priced model. It may be a good deal, or it may be the more costly choice because of construction deficiencies that shorten its useful life.

When calculating the initial cost, be sure to include all expenses—such as building permits and other fees, site survey costs if applicable, foundation costs (materials and labor), electrical wiring or plumbing, auxiliary equipment such as an electric generator, storage batteries, water reservoirs, safety fencing if required by local regulations. You may also have to pay for insurance (liability as well as property damage), taxes and financing the purchase. If you do not finance, consider how much interest will be lost by dipping into savings since that too will be part of the overall cost.

Also investigate how much the total cost can be reduced by state or federal tax credits. When comparing the cost of self-generated power against power purchased from a utility company, be sure to include estimates of rising costs and the effects of inflation. J.H.

See also: WIND GAUGE.

WHERE TO FIND IT

Additional details on the various kinds of windmills available today and the setting up of a windmill for home use can be found in *The Wind Power Book* by Jack Park (published by Cheshire Books, Palo Alto, CA). It is available in many shops that carry technical books.

How to Rebuild Windows the Easy Way

**You can replace loose,
rattling window channels
with new vinyl-clad metal
ones inexpensively. The job
takes about one hour
per window**

WINDOWS THAT RATTLE in their channels on every blustery winter day are more than just the source of an annoying racket or of uncomfortable drafts. They cost money in wasted fuel.

Fortunately loose sash windows, the largest single cause of heat loss in the average home, are easily repaired.

The repair is made with new aluminum and stainless steel channels at a low cost, if you do the work yourself. The new channels are finished in white vinyl enamel and are designed to fit any standard 1 $\frac{3}{8}$ -inch window sash.

You can install them in about one hour in almost any wood frame window. They

are particularly effective in the older rope-and-sash-weight type of window.

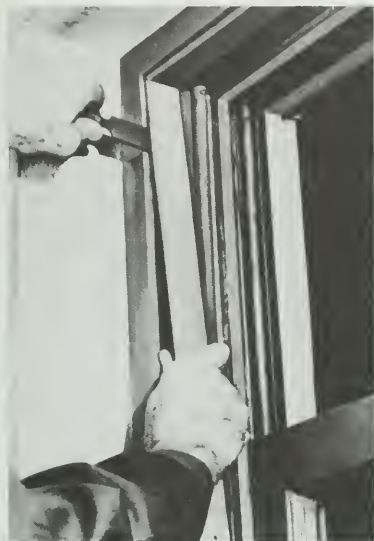
To install the metal window channel, first remove the inside stops, the faulty system, the parting bead and sash. Then, stand the two windows together upright and fit the metal channels to each side.

With the window sashes in the metal channels, pick up the whole assembly—sashes, balances and channels—as a unit and place them in the window frame. Nail or screw the channels to the framing around the window opening and the job is done.

See also: ALUMINUM; GLASS; HEATING SYSTEMS, HOME; HOME IMPROVEMENT; STORM DOORS AND WINDOWS; WEATHER-STRIPPING.

How to Rebuild Windows the Easy Way

3105



◀ Remove the stops, parting bead and balances from the worn window frame.

▼ Stand the two sashes together upright, as they would stand if the window were open from the top.



▲ Nail or screw the channels to the framing around the window and replace the front stops.

◀ With the sashes secured in the metal channels, pick up the sashes, balances and channels as a single unit and place them in the window frame.

Solving Problems in Windows and Doors

**Most difficulties with the
windows and doors of your
home can be solved easily.**

**Use these tips to
make them function properly
and cut your heating bills**

WINDOWS AND DOORS are functional as well as decorative features of the home, often neglected to the point that they cost their owners money and market value. There is the nuisance of doors and windows that don't close properly or open with ease. There is the resultant heat or cooling loss, translated into higher utility bills. And there is the rundown appearance that often accompanies these problems. All of these nags are avoidable with regular maintenance or minor repairs.

Doors first. Particularly, exterior doors that are used—and abused—constantly.

Begin with the obvious. Oil the hinges. Buy a squeeze tube of powdered graphite and squirt one shot into the key hole of the lock. Next, open the door and look at the edge, noting whether there are any horizontal abrasions, scraped paint, or bare wood. Look at the metal plate of the lock and see if there is any scratched, bright metal. Wherever these marks appear, look on the door frame opposite for a corresponding mark. These are frequent signs of door problems, and they tell a story.

Most edge marks appear on the upper half of the door, indicating sag. Sag is due to a loose upper hinge, and the remedy is fairly simple. Examine all of the hinges, testing screws for firmness. If they are stripped in their holes, remove the hinges and examine the wood. If the wood is basically sound, pack the stripped holes with wooden match stick bits and replace the hinge.

If, after packing stripped holes, the door still sags, remove the lower hinge plate on the frame side and place one thickness of cardboard in the mortised area. Replace the hinge plate. This in effect nudges or raises the door base fractionally, at the same time easing the top half of the door edge away from the frame. Two thicknesses may have to be used—and the top hinge plate may have to be set deeper into the door frame. To set deeper, remove the hinge plate on the frame side and chisel away about an eighth of an inch stock from the mortised area. With the hinge plate replaced, it will be more deeply seated, in effect pulling the door away from the frame on the lock side.

windows, acrylic: see storm doors and windows

windows, attic: see dormer

windows, caulking: see masonry

window screens: see screens

Solving Problems in Windows and Doors

3107

Other faults to look for include weatherstripping (the type mortised into the door's edge) that has somehow become crimped, causing it to seat improperly, in turn causing an ill-fitting door. A small section of metal flange may be torn and doubled over or broken off. These can be straightened or replaced easily.

The saddle or raised board that crosses the threshold may have popped out of its seat a little, causing the bottom of the door to snag. Again, look for scrape marks to confirm the condition. In most cases, the saddle can be banged back into place, restoring free action. If not, drive a few nails along the length to assure it will stay put. This should finally free the door and properly engage weathering flanges, if any.

The latching operation may be faulty, too. Abrasions on the strike plate will show if the bolt is riding too high or too low in relation to the slot—that is, the bolt could be riding a fraction of the rim of the strike plate instead of snapping into the slot. The two screws in the strike plate can be loos-

ened and the plate shifted, aligning the bolt fully with the slot. Sometimes it may be necessary to seat the strike plate a little more deeply in order to clear the lock plate.

Interior doors are not much of a bother, other than when they swell, causing stickiness. A dehumidifier in the house system will directly relieve this—otherwise, the doors will have to be sanded or planed. Check that hinge bolts are in all the way, to assure the door is hanging properly.

Combination storm/screen doors take additional care. The cylindrical door closers must be adjusted regularly. If they are not, they could cause the door to either slam shut or not close fully at all. A slight screw adjustment is all that's needed.

Storm door latches must engage fully. It should be a firm closure—no play or jiggling when latched. If so, adjust the latch plate on the door frame so that the play is eliminated.

With the storm door closed, examine the upper and lower corners for snugness and fit; i.e., the metal door frame should be



➤ A good finish keeps the weather out of wooden windows. Make sure that latches close securely.

flush against the door frame (usually a small weather-stripping bead is attached). If there are spaces or if light shows through, the frame has been bent. The remedy is direct: open the storm door and bend either the top half or the lower half in the opposite direction. Test the fit when closed and, if necessary, bend it some more.

The mitered corners of aluminum storm doors may separate slightly, as when children constantly kick the bottom element to open the door. Simple bending will not help. The screws at the miter joint should be removed along with the spine or element

Solving Problems in Windows and Doors within the frame that joins the two pieces at right angles. Only then can any dents in the frame be straightened and the parts rejoined in the correct square.

Windows out of whack. Double-hung windows should not give the homeowner much trouble if they are maintained in a good finish and lubricated regularly. An unblemished stain or paint job will keep the weather out of the wood and a silicone spray applied to the channels will keep the window elements moving freely.

On badly stuck windows, look for warp. The one answer is to remove the retaining



◀ Storm windows are generally trouble-free. Make sure that catches engage firmly.



◀ Careful caulking or insulating around an air conditioner will prevent loss of heat during the winter; provide a cool house in summer.

Solving Problems in Windows and Doors

3109

strips at the sides of the window frames and take the window section out. Marks on the wood will show where the window binds; this is where some stock will have to be removed. For slight warpage, use a power sander (coarse to medium to fine in three stages) on the raised section. Anything more than that, it would be convenient to use a plane, followed by a finish sanding.

After removing the high spots, test the action. If all is well, seal and paint (or stain) the treated section and replace the window. Be sure the retaining strips go back in the same position.

Window latches that do not close fully on an otherwise functioning window can be adjusted. Simply raise the hooked half with a layer or two of cardboard. The latch will now close.

Wood and metal casement windows need periodic attention, too. Wood units must be protected against outside weather and inside atmosphere with a good finish. When they stick, first look at the hardware fittings—check for stripped screws and soft wood. Do not necessarily sand a wood casement type, as the line and appearance may become spoiled; if necessary, sand lightly. Better to re-nail the frame (at the point of the bind), hopefully eliminating the slight bulge. The big remedy is to prevent warpage with a consistently good finish.

Metal casements should remain true, although in aged homes that have settled, the frames become out of square. The frame cannot be corrected, but the window can sometimes be bent slightly to accommodate to change. Nevertheless, there may be permanent damage—slight, but uncorrectable—resulting in spaces between the window and frame when the window is closed. This can be taken up by applying sticky-backed insulation strips to the inside edges of the frames; the windows then close against slight pressure, with all gaps filled by the insulation.

Combination storm/screen windows for



▲ Storm door latches must engage fully. It should be a firm closure. If there's play, adjust the latch plate on the door frame.

casements are generally trouble-free. Wood casements use screen or glass panels inserted from the room side. They are wonderfully elementary and don't bind. Storms for metal casements, however, are screwed to the frame on the outside, cushioned and insulated by a rubber or vinyl gasket between the storm frame and the window frame. In time, this insulation rots and must be replaced—an easy job that takes minutes.

See also: ALUMINUM; CAULKING; DOORS; GLASS; HEATING SYSTEMS, HOME; HOME IMPROVEMENT; SCREENS; STORM DOORS AND WINDOWS; WEATHER-STRIPPING; WINDOW REPAIR.

How to Install Double-pane Insulating Windows

Two thicknesses of glass sealed with an air space between them will keep the heat in your house and the cold out. They cost little more than storm windows, if you install them yourself

DDOUBLE-PANE GLASS installation has always been a problem for the home glazier—big panes of glass and extra heavy framing involve big expenses. But here is a way you can install small double-pane lights (panes of glass) in your present window framing with very little alteration. For a large, non-opening window with 12 or more lights, the cost of double-pane units will come to approximately the cost of a good metal storm window to cover it. Installing double-pane insulating units eliminates the need for storm sashes and all of the headaches that accompany them.

Begin by very carefully checking the framing for squareness and measuring the framework of each individual light. If framing is out of square, it must be fixed before ordering glass. Since each piece of double-pane glass is a sealed unit, cutting the unit to fit the frame would break the seal and

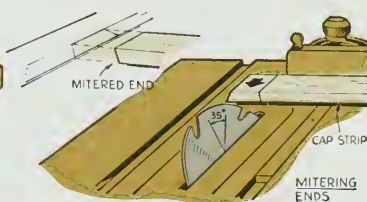
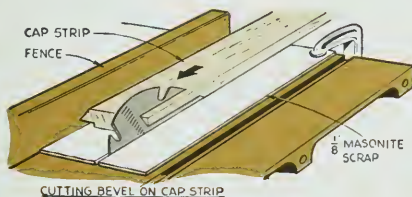
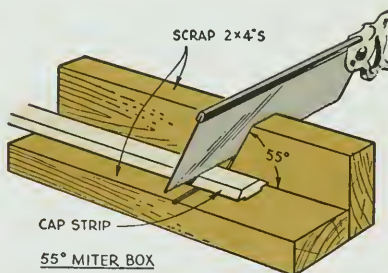
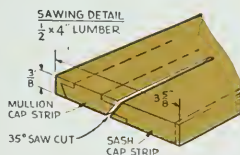
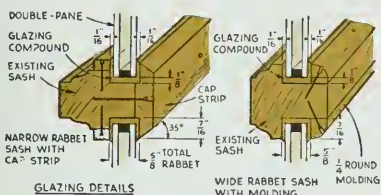
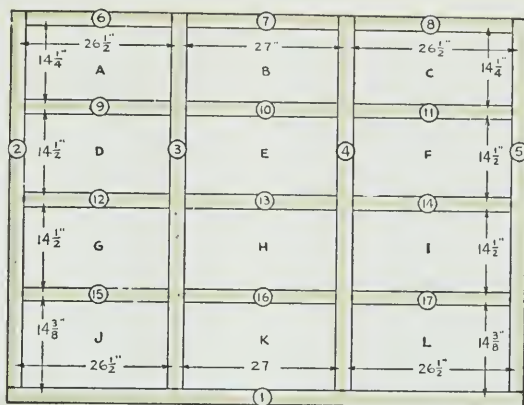
destroy its insulating properties. Lay out a rough plan of the window and pencil in each measurement. Double-pane units are made up to size with a tolerance of $\pm \frac{1}{16}$ -inch, so accuracy is very important. The individual units must not touch the framework on any side. The framework is apt to change shape with atmospheric conditions, and if the glass were touching the wood the pressures thus set up might break the air seal. Setting blocks or clips are used to keep the glass away from the frame rabbet. Subtract $\frac{1}{8}$ -inch from your measurements for each side of each unit in making up your order list. For example, if the frame opening is $14\frac{1}{4} \times 26\frac{1}{2}$ inches, the glass should be $14 \times 26\frac{1}{4}$ inches. Order the double-pane units through your local hardware store or glass company. Mail order houses also sell double-pane insulating glass.

Check the width of the existing rabbet. It should be about $\frac{5}{8}$ -inch (if you are using two $\frac{1}{8}$ -inch panes with $\frac{1}{4}$ -inch of dry air space sealed between them) to allow for $\frac{1}{16}$ -inch or more of glazing compound on the inside of the glass and between glass and cap or molding. If the rabbet is 1 inch or more, use quarter-round molding to hold the units in place.

If you are not using molding, sketch in the various cap strips you'll need to cover the outside mullions on your window lay-

How to Install Double-pane Insulating Windows

3111

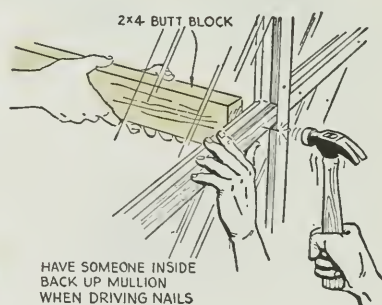
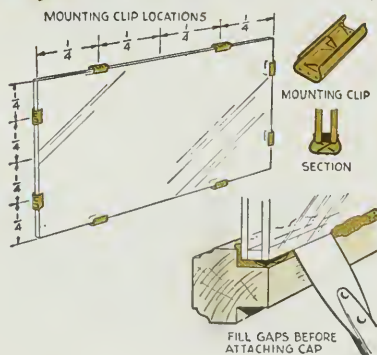
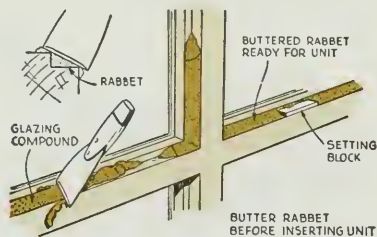


out and number them. A window approximately 5 x 7 feet requires four six-foot pieces of $\frac{1}{2}$ x 4-inch white pine, with two strips cut from each piece. One additional eight-foot piece of $\frac{3}{4}$ x 4-inch was needed for the bottom apron. The long strips should run vertically, to avoid miter inlets for water, with the short pieces running horizontally between the verticals. At the lumberyard personally select each piece of clear white pine, for a minimum of waste.

Figure the width of the cap by adding $\frac{7}{16}$ -inch for each flange to the width of the mullion. Cut the cap strips for the mullions. Cut the side, top, and bottom strips the width of the side, top and bottom sashes respectively, plus $\frac{3}{8}$ -inch for the flange. If the existing rabbet is less than the width required, rabbet out the cap strips as needed with dado or molding head on your circular saw. The total width of the sash rabbet plus the cap strip rabbet should be $\frac{5}{8}$ to



▲ Press window glass in evenly so that compound oozes out.



$\frac{1}{16}$ -inch to receive the double glass unit used. If you have no power tools, you can make cap strips from clear white pine. Carefully measure the width needed and plane the strips to size. If extra rabbets in the cap strips are needed, a local lumberyard or cabinet shop will probably do the job for a very nominal fee.

Set the saw at a 35° angle to bevel the cap strips. Run a piece of thin plywood or

How to Install Double-pane Insulating Windows

3113

hardboard into a saw between the fence and blade and clamp to the saw table so that there will be no danger of a finished bevel sliding under the fence while cutting the opposite bevel. Before changing the angle of the blade, cut the cap strips roughly to length with the square on the circular saw, allowing an inch or so for scrap. Unless the circular saw is fairly close to the window, a miter box will be needed for fitting the strips.

Cut and fit the strips over the present frame before removing any of the old glass. Fit the base strip first, then the long verticals, placing the mitered ends against the bevel of the base strip. Secure with one 3d finish nail driven part way in at each joint. Next, fit and trim the short top and cross-pieces to size with your back saw in a special miter box. Nail them in place as you did the long strips. Key them by numbers according to your layout, then remove and give each a base or prime coat of paint—to back side and ends as well as to face of the wood.

To insert your double-pane units, remove one of the old panes at a time starting at the bottom and install the new unit before removing the next light. Remove old putty and glazing points from rabbet with a screwdriver or other tool, then give rabbet coat of quick-drying lacquer to seal the wood. Next, butter the rabbet with a good non-drying glazing compound and putty knife. Locate the setting blocks (must be at

least the thickness of double-pane unit) or clips (obtain from your glass dealer) $\frac{1}{4}$ -inch of the width in from each end. Place the bottom edge of the units on the setting blocks and press the unit in evenly, allowing equal clearance between all edges and sash. Clips equalize the clearance automatically. Fill all edge spaces between glass and sash with compound. The sash or mullions *must not* come in contact with the glass unit at any point. See the drawing of glazing details for correct spacing of glass in sash. Insert rest of units and clean off excess compound before putting on the cap strips.

Back up the mullion and drive one finish nail along the cap strips every 6 to 8 inches. Set the nails below the surface and fill holes with compound before the final painting.

With the cap strips all in place, fill in the gap with compound and point up all the edges. A good coat of outside paint to match the rest of the house trim finishes the job.

D.M.S.

See also: ALUMINUM; GLASS; HOME IMPROVEMENT; TABLE SAW; TOOLS; TOOL TECHNIQUES.

CAP STRIP LENGTHS

No. of Units	Piece Number	Approx. Length
1	#1	7' 6"
4	#2, 3, 4, 5	5' 6"
3	#6, 7, 8	30"
9	#9 through 17	30"

OPENING AND GLASS SIZES

No. of Units	Opening	Size (Inside of rabbet)	Glass Size ($\frac{1}{8}$ " clearance all 4 sides)
2	A & C	14 $\frac{1}{4}$ x 26 $\frac{1}{2}$ "	14 x 26 $\frac{1}{4}$ "
1	B	14 $\frac{1}{4}$ x 27"	14 x 26 $\frac{3}{4}$ "
4	D, F, G, & I	14 $\frac{1}{2}$ x 26 $\frac{1}{2}$ "	14 $\frac{1}{4}$ x 26 $\frac{1}{4}$ "
2	E, H	14 $\frac{1}{2}$ x 27"	14 $\frac{1}{4}$ x 26 $\frac{3}{4}$ "
2	J, L	14 $\frac{3}{8}$ x 26 $\frac{1}{2}$ "	14 $\frac{1}{8}$ x 26 $\frac{1}{4}$ "
1	K	14 $\frac{3}{8}$ x 27"	14 $\frac{1}{8}$ x 26 $\frac{3}{4}$ "



Combination Buffet and Wine Cellar

**This handsome mobile bar
can be built of veneered plywood
with simple hand tools**

THIS WINE CELLAR buffet has been designed carefully to be a handsome wine storage and serving center, easily holding more than three dozen bottles. Its removable dividers make it easy for you to store your wines in a logical manner, with red wines, white wines, dessert wines, and sparkling wines each in its own section.

Or, you can use the cabinet as a portable bar for mixing and serving cocktails. It will hold liquor, mixers, glasses, ice bucket,

cocktail shaker, and other bar accessories, and its two slide-out shelves provide handy work surfaces.

Construction is of plywood, and you can choose one of the many veneered types that are available, such as birch, mahogany, walnut, ash, etc. To give the finished cabinet a professional look, use matching flexible wood tape to cover the exposed plywood edges.

There are no curves to cut out, or difficult

wine rack: see plastics, fabricating

wireless intercom: see intercoms

wiring, auto: see electrical, auto

Combination Buffet and Wine Cellar

3115

joints to make, so only the simplest hand tools are needed. Follow the cutting diagrams for the side pieces "A," base panels "B," and tops "C." Cut them from $\frac{3}{4}$ -inch thick plywood. For shelves "D" and "E," back panels "F," and dividers "G" and "H," cut from the $\frac{1}{2}$ -inch plywood panel. For best results, measure for the dividers after the rest of the cabinet has been assembled.

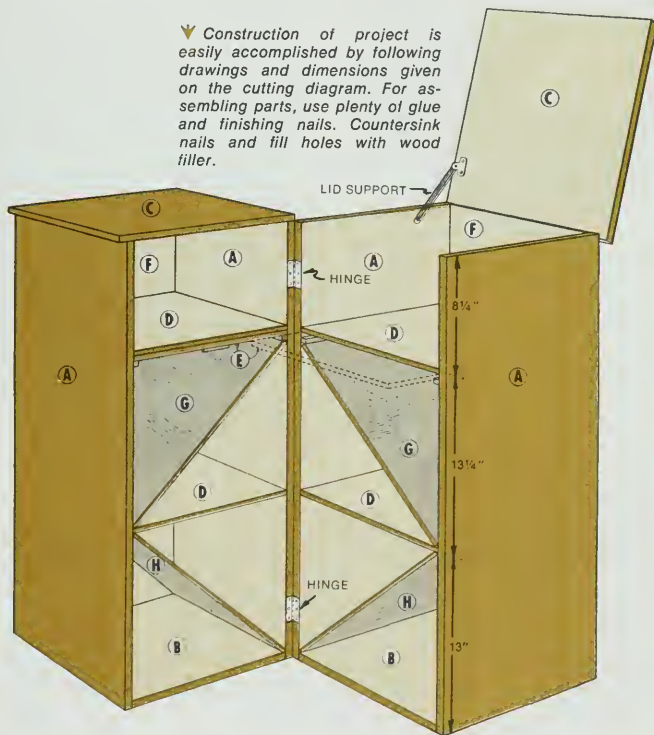
Note that the cabinet is made up of two box sections that are hinged together. Make up each box by nailing side and back panels to the bases and shelves as shown in the drawings. Use a good glue on all mating surfaces for strong, permanent joints. Use

finishing nails, set the heads, and cover with wood filler.

Cut four $15\frac{3}{8}$ -inch lengths of $\frac{1}{2} \times \frac{1}{2}$ -inch hardwood. Glue and nail one to each side panel about 1 inch below the top shelf. These are cleats that provide support for the sliding shelves "E." Be sure to leave enough clearance below the fixed shelves so the sliding ones will operate without binding.

Glue a $\frac{1}{4} \times \frac{1}{4} \times 3$ -inch block of hardwood below the front edge of each sliding shelf for use as shelf pulls. Measure for dividers "G" and "H," cut them out, and slide them into position.

Install the two top panels with piano



3116

hinges. Use brass flat head wood screws, and be sure to drill pilot holes. Install a lid support for each top, as shown in the drawing. Now all exposed plywood edges on the cabinet can be covered with wood tape, using a good contact cement.

Notch one side panel on each section for the butt hinges. Take your time when cutting them, and measure carefully so the two sections will align when the hinges are installed. A good way to accomplish this is to place the two units side by side, clamp them together, and then mark and cut the notches. Drill pilot holes for the screws, and install two hinges.

Combination Buffet and Wine Cellar

Sand all surfaces lightly, wipe them free of dust with a tack rag, and apply a coat of varnish or similar finish. When this is dry, sand lightly again, wipe with a tack rag, and apply a second coat. If additional coats are needed, be sure to sand lightly before each is applied.

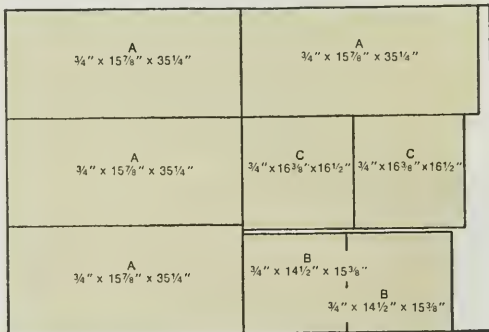
For the final touch, install a pair of ring-type towel holders on the front. Use them to open the cabinet, and as towel rings if the cabinet is being used as a bar.

Original design by Steve Ellingson.

See also: BARS; FINISHING, WOOD; FURNITURE, INDOOR; PLASTICS, FABRICATING; SERVERS; WOODWORKING.

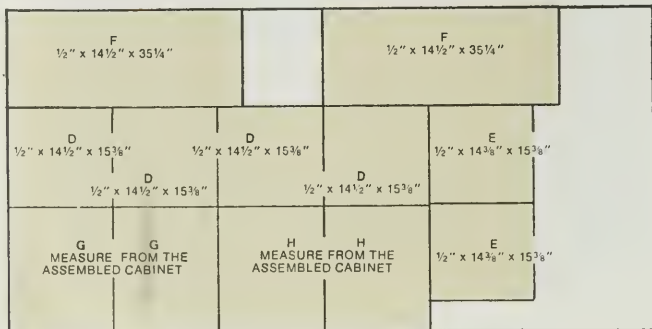
CUTTING DIAGRAM

$\frac{3}{4}$ " x 4' x 6' PLYWOOD



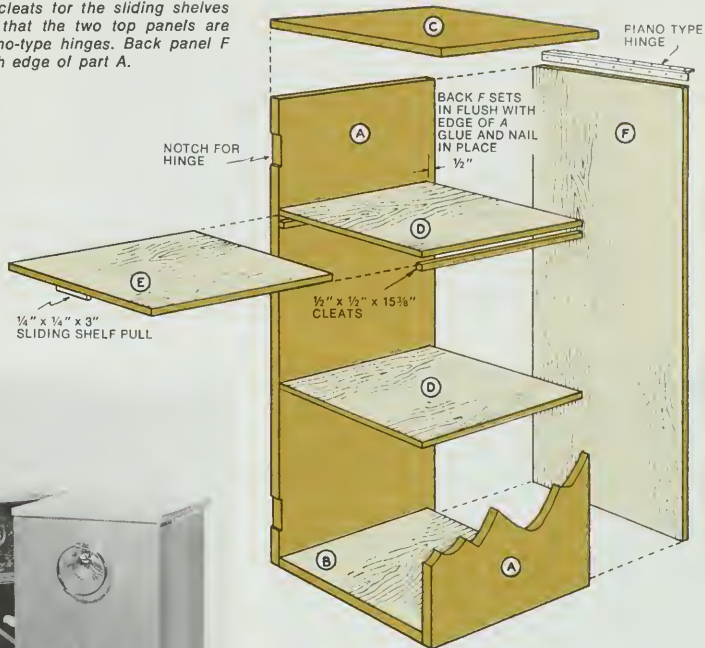
➤ The diagonal partitions G and H should be measured and cut to fit the assembled cabinet to insure proper fit. These are for wine storage only, and can be eliminated if cabinet is to be used as a liquor cabinet or a bar. ▼

$\frac{1}{2}$ " x 4' x 8' PLYWOOD



Combination Buffet and Wine Cellar

➤ Glue and nail cleats for the sliding shelves in position. Note that the two top panels are installed with piano-type hinges. Back panel F is set in flush with edge of part A.



◀ Pair of ring-type towel holders installed on the front can be used as towel rings if cabinet is used as a bar.

MATERIALS LIST

Quantity	Size and Description	Purpose
1	$\frac{3}{4}$ " 4'x6' plywood	parts A, B and C
1	$\frac{1}{2}$ " 4'x8' plywood	parts D, E, F, G, and H
1	$\frac{1}{2}$ " $\frac{1}{2}$ "x62" hardwood	cleats

NOTE: Also need butt hinges, piano hinges, towel rings, flexible wood tape, contact cement, glue, wood filler, finishing nails, lid supports, casters and finishing materials.

How to Work Safely with Electricity

A few simple rules and keeping your mind on what you are doing can save you costly repairs of damage and prevent tragic accidents

A LITTLE KNOWLEDGE can be a dangerous thing. Do not prove this adage by assuming that simple electrical jobs can be done hastily. Work only when there are no distractions, when you feel alert, and when your mind is fully on the job at hand. Here are a few basic safety guidelines. Your common sense will discover more as you gain electrical work experience.

Anyone can rewire a table lamp, install a battery-operated alarm system, or handle any other such "safe" electrical job without a great deal of electrical experience. Yet such a simple operation as boring a hole through a wall for a bell wire can be risky if the wrong tool is employed. The addition of new lighting fixtures, the installation of extra wall receptacles, and any other work involving the main power lines of a home can be hazardous. The novice should study a house wiring guide thoroughly before starting work. For example, a newly installed fixture may appear to function perfectly, but improper wiring

may defeat the grounding system and make the new receptacle or fixture a potentially lethal boobytrap.

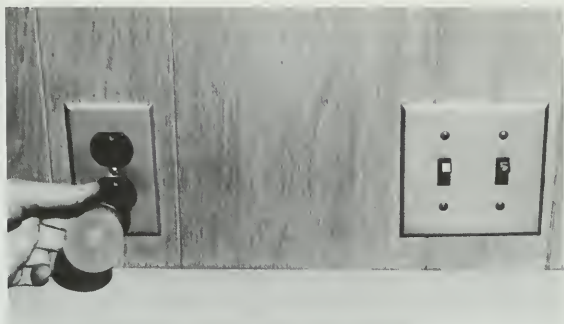
Even those who know the basics of house wiring sometimes take unnecessary risks. They use power tools that are not properly grounded, use them on circuits that are assumed to be grounded but are not, or use them when manual tools are safer. Familiarity with electricity should not be allowed to breed indifference to sensible safety practices.

Safe tools. There is simply no excuse for anyone to use ungrounded power tools. New tools of reputable make have three-wire cords with grounding plugs. And it is easy and cheap enough to add a grounding cord and plug to an old tool not so equipped. Just open the tool and replace the old cord with a three-wire lead of adequate current-carrying capacity. Attach the third, ground wire to the shell of the tool, taking care to keep it well insulated from the power leads.

While you are at it, get enough of the three-wire cord to make a grounded extension cord. It will double the usefulness of the tool.

The three-pronged plug of course needs to be used in grounding receptacles. If you have none at present, use an adapter. But make sure that the adapter pigtail is

➤ Be sure to test for an open circuit before beginning to work on a wall fixture. The outlet in the picture may not be on the same circuit as the light switches. Testing with a bulb will ensure that the power is off and that you may begin work.

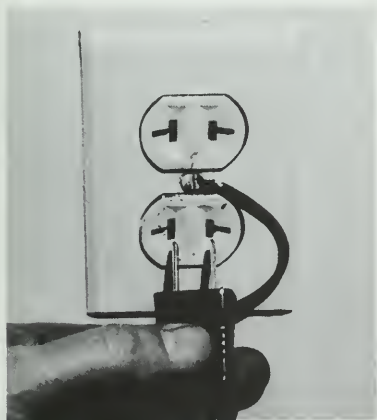


fastened to the screw holding the receptacle plate, and that the plate is properly grounded through the house power lines. Test with a trouble light to make certain.

You should be able to use your grounded tools anywhere in the house without fussing with adapters which should be considered only as emergency conveniences. Choose a number of conveniently scattered receptacles and replace them with polarized receptacles that will accept the grounding plugs. For example, one such grounding receptacle in the kitchen



▲ When testing for a live circuit, a neon tester and two types of bulb sockets—one with leads, one plug-in—come in handy. To test for a grounded circuit, touch a lead to the cover plate; the bulb should light when other lead is pushed into socket.



◀ Only fifteen seconds are needed to fasten this grounding adapter into place. Unless pigtail is attached and tool cords have three-pronged grounding plugs, adapter is useless.

may serve several adjacent rooms as well if your extension cord is long enough. You may need another in the bedroom area, one or two in the basement (many local codes now demand that all basement outlets be of the polarized type), another in the garage, and elsewhere in the home.

Use tools safely. A power drill can greatly speed work when, for example, many holes must be drilled through beams and studs for BX cable. But the power drill should be used only on exposed structural members; it is dangerous to drill blindly into walls, floors and ceilings that have already been covered because a power drill can quickly cut into unseen power lines. The operator of the drill may be killed and the house may be set afire. A manual drill or bit and brace should always be used when boring holes in such places.

Before using a saber saw to cut a hole in a wall for, say, a new receptacle box, hand bore a pilot hole that is large enough to permit inspection for power lines. Even

✚ *Use a manual bit and brace when drilling holes in walls. A power drill may damage hidden wiring and cause shorts or shock.*



How to Work Safely with Electricity

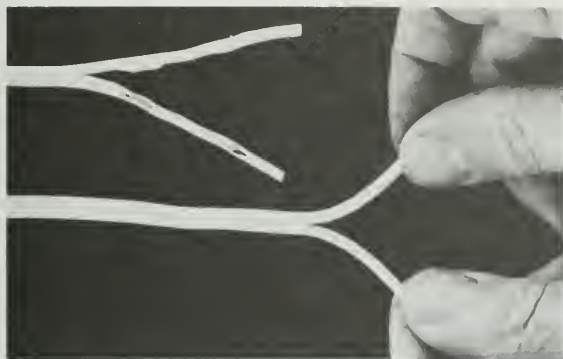
if you feel that the saber saw cannot cut through an armored cable without your knowing it, there may be other good reasons for avoiding blind sawing. For example, if your home has a low-voltage switching system, you may cut into these unarmored lines. You will not be killed, but why risk avoidable repair jobs?

Safety tests. For some reason, most people fear rattlesnakes more than they do defective electrical fixtures although many more people die each year from electrical shock than from snakebite. Remember that house current is deadlier and faster than snake venom, and often there is no time for first aid.

Take nothing for granted when doing electrical work. Do not assume that every receptacle box in your home is properly grounded, especially in older homes. Test each box with a trouble light such as a neon tester or a low-wattage bulb screwed into a rubber covered "pigtail" socket having short wires with bared tips that serve as probes. To test for proper grounding, touch one probe to the receptacle cover plate, and the other to each of the receptacle openings. If the bulb does not light with either side of the receptacle, there is no ground.

Do not work on a receptacle or fixture without first testing to make sure that power in the circuit has been cut off by removal of the proper fuse or pushing the right circuit breaker. After opening the box and removing the enclosed fixture, remove the wire nuts and again use the trouble light to double check that the bared wire ends are not alive.

If you know that several wall receptacles are on the same circuit, plug a bulb into one receptacle not being worked on. Use a pronged socket of the type shown. The light will alert you to a live circuit in case you turn on the power to test your new work, and then forget to turn it off again before resuming work.



◀ Lamp (zip) cord should always be separated by pulling the two halves apart by hand. Cutting it with a knife or metal tool often exposes some bare wire.

Do not assume that electrical fixtures are on the same circuit simply because they happen to be in close proximity to each other. For example, a wall outlet may not be on the same circuit with a nearby switch controlling ceiling lights. Test to make sure.

Unhurried work. Adopt a craftsman's attitude when doing electrical work. This means an unhurried approach, and attention to proper working techniques.

Learn how to strip wires properly. The metal wire in a BX cable looks stronger



▲ Watch that soldering iron. It stays hot enough for a while to burn through cord insulations.



◀ Be sure power has been turned off before prying frozen or damaged plug from a receptacle with metal tool.

than it is. If you nick the copper wire when removing insulation, you create a weak spot that may become weaker when you twist the bared ends of wires together to form a splice. Then when the wires are crammed into the receptacle box, the added strain may be just enough to snap the wire or make it so thin an electrical path that it will burn out when power is applied.

When separating the two halves of lamp "zip" cord, do not use a knife except to start the separation which should be completed by pulling the halves apart by hand. Cutting with a knife not only takes longer, but it often bares wire where it should not be bared.

When connecting wires to lamp sockets or plugs, make neat connections having no splayed wire strands that can cause short circuits. If the plug has a cardboard terminal cover—use it.

Common sense. Many electrical accidents could be avoided just by using a little common sense. Like standing on a rubber mat or dry plywood when changing fuses in a damp floor or ground area. Like keeping small children out of the work area; not only are the children endangered, but they may distract you into an accident.

The plugs on lamp and appliance cords sometimes corrode or for other reasons jam in wall receptacles. Or the plug may break when it is removed, leaving a prong in the outlet. Never use a screwdriver or pliers to remove the defective plug until power in the circuit has been cut off. Even if the tool has an insulated handle, its use in a live fixture is not entirely safe. At the very least, the metal part of the tool may cause a short between the defective plug and the receptacle cover plate and give you a good fright.

Watch what you do with your soldering equipment. For example, the tip of a soldering gun remains hot for some time

How to Work Safely with Electricity

after the gun is put down, it could easily burn through the insulation of the gun's own power cord.

And do not use a torch when soldering inside wall or ceiling fixtures. Fine dust behind the metal box may smolder unobserved and burst into flame hours later when you are asleep.

Shop for safety. A plethora of new electrical gadgets are flooding hardware and department store counters. Some of these "convenience" devices are good, others are of dubious worth. If an item that attracts your eye does not carry the Underwriters' Laboratory (UL) label, buy with caution.

For example, a number of different wall receptacle adapters are now available that convert a standard duplex outlet into one having as many as eight outlets. Admittedly, some of these devices are improvements over older types of multiple-outlet adapters because they are sturdier and flatter.

But some designs are clearly too hazardous for many of the applications advertised. One style of multiple outlet has two parallel slots through which the two ten-inch long terminals are clearly visible. Such a device would be extremely hazardous in a child's room though the device is advertised as handy for plugging in electrical toys. Nor is it suitable for another proposed use—the workshop because it defeats the primary safety need in any workshop—grounded outlets.

Leave such gimmicks for others. If you need a multiple outlet, put in a bigger box and add another standard receptacle, preferably a grounded type. It will last longer, be cheaper in the long run, and above all much safer.

See also: ADDITIONS, HOME; CIRCUITS, ELECTRICAL; DIMMER, LIGHT; DOORBELL, CHIMES; ELECTRICITY; FLUORESCENT LIGHTING; HOME IMPROVEMENT; ILLUMINATION; INTERCOMS; LIGHTING; POWER TOOLS; REMOTE CONTROL SWITCHES; SPLICING; WALL SWITCHES; WORKBENCH.

Safe Wiring Indicator

**With this easy-to-build
gadget, you will know for sure
if your three-wire
outlet is safe**

WOULD YOU SPEND A FEW dollars to make a small neon indicator that might save your life? Simple to build and even easier to use, the safe wiring indicator will point out safe and unsafe AC outlets before you discover them the hard way. As you know, homes and factories are being wired with grounded electrical outlets. This means that you have the two regular blade openings plus a round opening in each electrical outlet. The round socket is wired to a ground wire that goes from each receptacle and metal box back to a ground rod at the meter box or to a water pipe.

There is also a brass screw in each outlet that is supposed to connect to the black wire and a white nickel screw that is supposed to connect to the white wire.

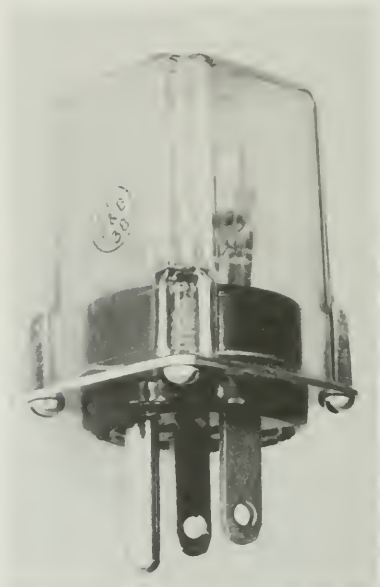
If you have a safe wiring indicator you can plug it into the outlet you want to use and if both indicator bulbs light it is safe to go ahead and use the receptacle. The safe wiring indicator can answer one of six possible questions:

1. Has the receptacle been wired correctly?
2. Is the black "hot" wire open circuit?
3. Is the white wire open circuit?



Safe Wiring Indicator

◀ To use the tester, plug into an outlet. When both neon lamps light, the grounding is good, if the main ground wire is in place at the meter box (determine this by visual inspection).



▲ Use any sturdy plastic container that will accept the three-prong plug, neon bulbs and resistors. The bulbs may be fully enclosed in a transparent container, such as a medicine vial or, in this case, the cover of a discarded electrical relay. If an opaque container is used, choose neon indicator lights than can be mounted in holes drilled in the top of the container.

◀ Attach one lead of each neon bulb to a common terminal (gold), one resistor to the silver terminal and one resistor to the ground terminal. Then solder the remaining leads from the bulbs to the free ends of the resistors. Check for possible short circuits and add spaghetti to wires if necessary.

INDICATOR LIGHTS CHART

Explanation of Indication	Light No. 1	Light No. 2
Wiring is safe to use	On	On
Black wire open	Off	Off
White wire open	Off	On
Ground wire open	On	Off
Black and white reversed	On	Off
Black and ground reversed	Off	On

4. Is the ground wire open circuit?
5. Are the black and white wires reversed?
6. Are the black and ground wires reversed?

You can refer to the Indicator Lights Chart for the proper light sequence. This is all done by two neon bulbs with series resistors wired to a grounding type AC plug. To make the unit convenient to use, the parts are mounted in a plastic case adapted to plug into any grounded electrical receptacle. The indicator will give you a lifetime of protection from improperly wired electrical outlets.

The mounting plate for the AC plug must be made since no known company supplies one ready-made. The neon bulbs on plastic lenses can be pressed into $\frac{5}{32}$ -inch diameter holes. If necessary, a few spots of model cement may be used to lock them in place. Use 47,000-ohm, $\frac{1}{2}$ -watt series resistors to make the neon bulbs burn brighter. Since the neon bulbs will only be lit briefly, their life should be practically forever. Use sleeving on all bare wires to prevent shorts. You can paint the inside of the plastic case with black model paint to hide the interior wiring.

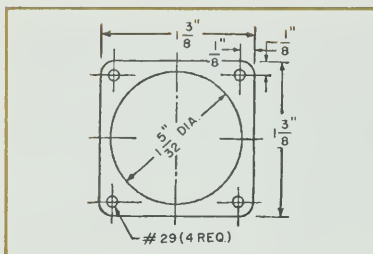
Once the safe wiring indicator is finished either test it by plugging it into a properly wired outlet or by using clip leads connect it to a conventional wall outlet and the ground to a nearby cold water pipe. If the indications are correct (refer to the chart)

you can put it away until you need it to test an unfamiliar electrical outlet.

CAUTION! There are two things this device won't tell you:

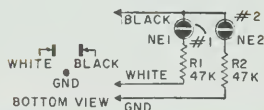
1. When the white and ground wires are reversed. This isn't too important since in most cases the white wire is grounded at the meter box anyway.
2. Whether or not the ground wire is in place at the meter box. A visual inspection will soon verify this fact.

See also: CIRCUITS, ELECTRICAL; DIMMER, LIGHT; ELECTRICITY; REMOTE CONTROL SWITCHES; SPLICING; WALL SWITCHES.



▲ Since mounting plate for three-wire AC plug is not readily available, it can be made from sheet metal using dimensions shown here.

SCHEMATIC DIAGRAM



PARTS LIST—Construction Time: 1 hour

NE1, Neon indicator (Econoglow Type 117-Red,
NE2 Allied Radio 7EE900, or equivalent)

R1, R2 47,000-ohm, $\frac{1}{2}$ -watt resistor

Plastic case for mounting relay (Allied Radio 75P55B or equivalent)

AC plug, three terminal (Amphenol 160-11)

Misc. Sleeving, screws, sheet metal, solder, etc.

How to Rewire Old Lamps

Frayed cords and loose sockets are dangerous, but repairing them is easy

GETTING A NEW WIRE through the lamp may be the hardest part of rewiring a lamp, so do not yank out the old cord until deciding whether it should be used as a leader to feed through the new wire. Cut away most of the old cord, leaving a foot or so protruding from the lamp. Strip about 1½ inches of insulation from one lead of both the old and new cords. Hook these bared wires together and twist for a secure splice. Cut down the unstripped ends to avoid extra bulk, then wrap the splice with thin, transparent adhesive tape to keep the temporary splice from separating. Now use

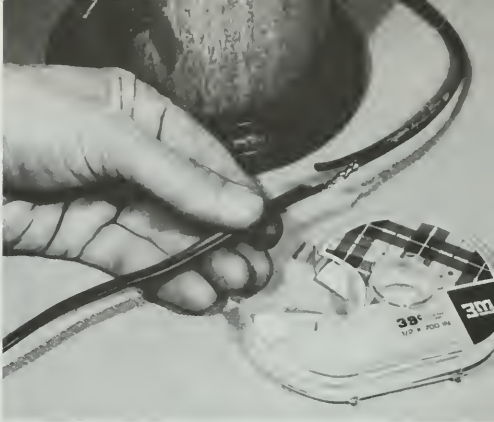
the old cord to pull the new cord through the lamp.

Attaching the stripped wires to the two terminal bolts of the new socket is easy, provided that you twist the wire ends clockwise around the bolts as shown. The connections should be neat, tight and devoid of splayed wire strands. Use an Undewriters' knot.

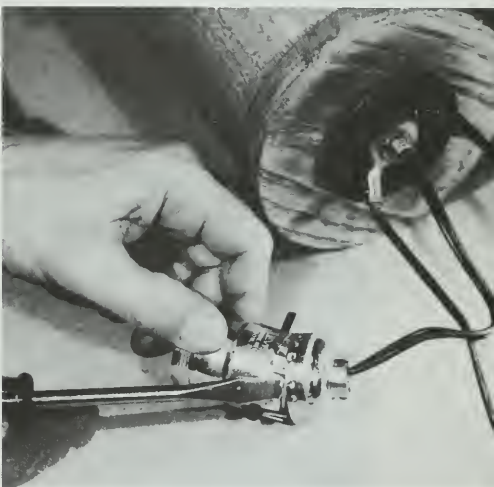
No-strip plugs of the kind shown are very easy to install. In some cases you just poke in the unstripped wire and snap the plug together. It's about a three-second job. When using a conventional plug having bolt

How to Rewire Old Lamps

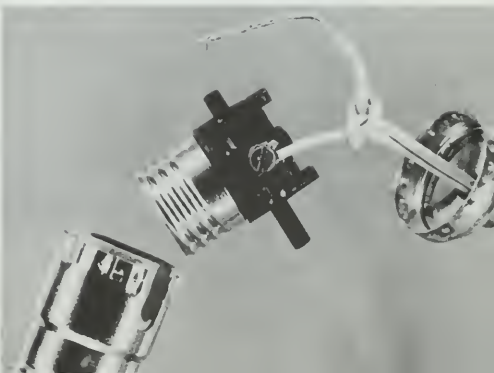
➤ Use old cord as a leader to pull new cord through the lamp. Rough-splice the new and old cords together and wrap with thin tape to hold splice together. Pull cords through the lamp and unsplice.

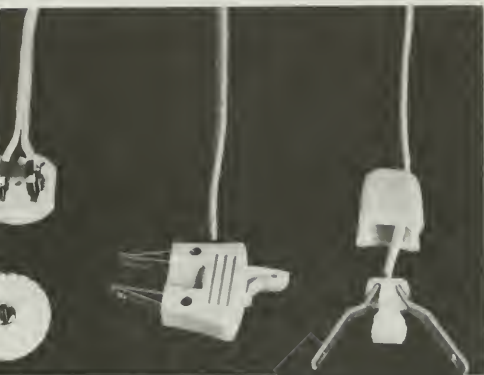


➤ Loosen lock bolt and unscrew old socket from lamp. Open the socket by prying cap off where the socket is marked "press."



➤ Assembly of light socket is easy if plenty of insulation is stripped from cord ends. Twist strands, wrap around the terminal bolt in clockwise direction and tighten. Cut off the extra wire cleanly.





▲ Before adding shade to rewired lamp, be sure that the socket push buttons do not jam against the lyre that holds the shade.

terminals, use the Underwriters' knot and connect the bared wires as shown in the photo.

See also: DIMMER, LIGHT; ELECTRICITY; FLUORESCENT LIGHTING; SPLICING.

How to Rewire Old Lamps

◀ Three common types of no-strip plugs. All use sharp prongs to penetrate insulation and contact wires. Wiring takes seconds.

▼ The SU (Simplified Underwriters') method helps you remember Underwriters' Knot. S means S-shape, U means under. Dangle cord vertically, form a horizontal S-shape with the free ends. Tuck the two cord ends through opposite loops from the under side. Pull tight.



▼ Keep the lamp cord out of the way with these small clips. They are simply inserted by hand behind the baseboards.



Wiring an Extra Room

Most of the cost of electrical wiring goes to pay the electrician. The cost of the wire, switches, outlets and other fixtures is relatively little. If you install them yourself, you can pocket the difference

IF YOU ADD A ROOM to your house, or re-finish an attic or basement, you can save a tidy portion of the cost by doing the electrical work yourself.

The cost of the hardware that you use is relatively little, compared with the high price you would pay for the labor of an electrician.

Once the room is framed, but before the insulation is in place or the wall covered with paneling, gypsum board or whatever you are using as a surface, get started with the wiring.

Each step of an electrical job must meet strict standards of workmanship. This refers to conforming with the codes established by government bodies, municipalities, and industrial organizations, which specify the kinds of wire to be used, the selection and placement of boxes, methods of grounding, types and spacing of supports for devices and cables.

Of equal importance in any electrical work is the technique. This means, simply, doing the job right so it will be trouble-free, long-lasting, and have as good an appearance as the circumstances warrant.

The homeowner who does only an occasional bit of wiring or electrical installation must be on the alert to be sure that every phase of his work is correct, missing no detail and avoiding any shortcuts that will result in an inadequate installation.

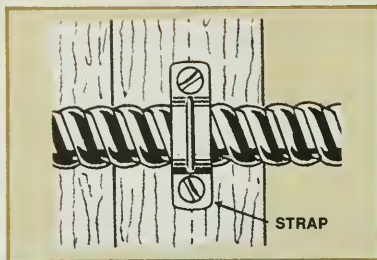
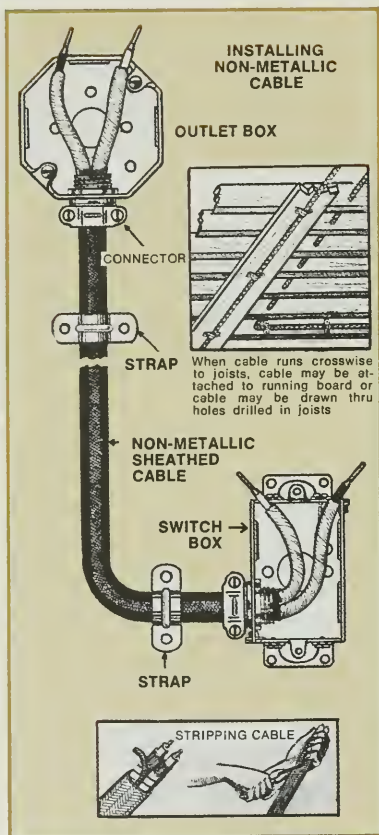
If protective bushings are needed at the ends of BX cable, be sure to put them in before going further. Where supporting straps are called for every 3 feet, don't try to skimp with wider spacing. Terminal connections must always be secure, so make sure they are really tight.

With all this, there's plenty of latitude to cope with every possible situation because each installation is somewhat different in location, encumbrances, and the twists and turns. That means using common sense together with tried-and-proven methods to solve individual problems.

Handling BX cable. Armored cable is broken by making a shallow cut with a hacksaw, across one section of the metal spiral, then twisting to snip the armored covering.

The easiest way is when the BX is on a workbench where it can be held down, but this is not usually possible because the cable must be cut on location, or when part may be inside a wall. In that case, the cable is either pulled so it is taut, or wrapped around one leg and held tightly against the knee so you have a steady and rigid support.

Hold the hacksaw at an angle across the spiral. A few strokes of the blade will make a starting nick, then cut just enough to go part way through the metal. It's not necessary to cut all the way through. Twisting the cable armor will snap it off at the cutting



armor. The wires inside have a water-repellent paper wrapping with a bare stripper wire inside the wrapping. Pull this wire to the cut end of the BX and cut it near the end by bending it back over the armor. Then tear off the paper wrapping to expose the insulated wires.

Put a fiber protective bushing at once into the end of the spiral to protect the wire insulation from the sharp edges of the cut armor.

The cable now can be connected into a junction box, which is secured to a wall stud with nails or firmly attached in some other way to a solid support. The box has "knockout" openings on the sides and back. Select the point of entry for the cable, remove the knockout by driving a screwdriver into a corner until the round metal plate is pushed out and can be bent back and forth until it breaks off.

Anchoring the cable. Some junction boxes have built-in cable clamps, others require separate connectors on each cable that goes into the box. With the built-in clamps, just insert the cable through the knockout opening and under the clamp, and tighten the screw that anchors the cable in place.

Most boxes, however, require use of separate connectors which are in two parts: a threaded bushing with setscrew, and a locknut. Slip the fiber bushing part on the cable armor so the protector touches the front of the connector, and with the bond

place. Be careful never to cut deeply enough to damage the wire insulation.

When measuring for the cut, always allow for at least 8 inches of exposed wire to make splices and connections. This may require two cuts each time. The first includes cutting through the wires to separate lengths of the cable. The second cut is to remove enough of the armor to expose the inside wire for making the connections.

At the second cut, twist off the broken

Wiring an Extra Room

3131

wire bent back underneath. Tighten the bushing screw, then bend the bond wire around the setscrew. Push the wires and bushing into the box opening, then turn the locknut onto the threaded bushing. Turn the locknut as far as you can by hand, then give it a few taps with hammer and chisel or screwdriver to make it tight.

Armored cable must be supported with a strap no more than 12 inches from every junction, outlet or switch box, except for concealed runs behind walls where it would not be possible to fasten the straps.

Large staples can be used though straps, and cable clamps attached with screws give stronger support. Straps should be spaced no more than 4½ feet apart to prevent sag and resist any pull on the cable. Avoid running any cable at hidden places where there is a possibility that nails will be driven through it.

Installing non-metallic cable. Strip the sheathing by pulling the build-in rip cord, or with a cable ripper. Allow at least 8 inches of wire for making splices or terminal connections. Fasten the cable at junction and receptacle boxes with a threaded connector and locknut similar to the type used for armored cable except that there is a clamp across the cable instead of the setscrew. When non-metallic cable includes a grounding cable, this must be protected from damage and included in the terminal connections.

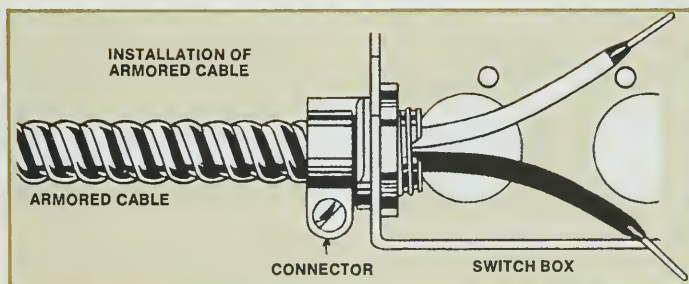
This cable may be run through a series of holes in ceiling joists or wall studs, but requires supporting strips (not staples) every 3 feet. Where there is an open run, as across ceiling joists, a supporting board is required to which the required straps can be attached.

In concealed installations of new work, cable is fastened with straps at least every 4½ feet, and within 12 inches of every junction or switch. This is not required for old work.

Splicing wires. The essential first step in electrical work is to learn the right way to splice wires. Two or more cables may enter the same box, and the wires spliced together inside, or connected to some device such as a receptacle or light fixture. The insulation is skinned for a distance of 1 to 1½ inches before or after the wires are put into the box. Always allow sufficient length of free wire so it can be conveniently handled.

Wires are skinned most quickly and easily with a wire stripper, or with a pocket knife. Make it a habit each time to scrape the exposed wire with a knife edge to remove any oxidation or bits of insulation.

The stripper tool blades are beveled so they cut the insulation properly at a neat taper all around, rather than straight across which would prevent mating the wires closely in a splice. Adjust the tool for the particular wire diameter that you are going to install.





▲ If bench vise isn't handy, cut through armored cable by drawing it across your knee to get some tension.



▲ Break the sheathing by twisting and bending where it was notched with hacksaw. Pull cord to split paper.



▲ Protect wire insulation from jagged end of the cable by pushing a round fiber washer into the open end.

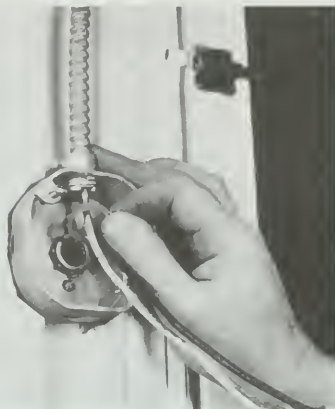


▲ Connector slipped over cable armor and locked by tightening set screw, will hold the wire to junction box.

Wiring an Extra Room

3133

◀ After knockout slug is removed, insert threaded end of connector into the box and fasten with a lock nut, as in the photos. ▶

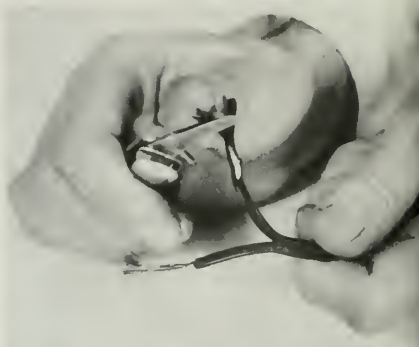


➤ Some boxes have a built-in cable anchor with a set screw that is tightened over the cable to hold it.



The novice, skinning insulation with a knife, usually makes the error of cutting through the insulation straight across, and all around. When stripping with a knife, cut through the covering at an angle, until

enough of the insulation can be gripped with your fingers so it can be pulled all the way to the end of the wire. Then additional bevel cuts are made to clear the rest of the insulation neatly.



▲ A pocket knife can be used to remove insulation by cutting it at a slant, just like sharpening a pencil.

◀ A wire stripper has a series of openings that can be used to cut into insulation without damaging the wire.



➤ First coat wires with electrical soldering paste, then heat them so the solder can melt into every crevice.

When two wires are spliced, the ends are brought together parallel, then twisted into a tight coil with pliers.

Solderless connectors. A splice can be joined with a solderless connector. Make sure it is of the right size for your wire.

These connectors are the same for sizes

#14 to #18, while #12 and #10 wires take individual size connectors. Just screw on the connector all the way so it is tight. If the spring coil inside is loose or the connector fails to hold tightly, discard it and use another one.

Some electricians prefer to tape up the

SELECTION GUIDE FOR FLUORESCENT TUBES

Use	Wattage and Color
READING, WRITING, SEWING	
Occasional	1 40w or 2 20w, WWX or CWX
Prolonged	2 40w or 2 30w, WWX or CWX
Small living area wall lighting (8-foot minimum)	2 40w, WWX or CWX
Large living area wall lighting (16-foot minimum)	4 40w, WWX or CWX
GROOMING	
One fixture each side of bathroom mirror	2 20w or 2 30w, WWX
One fixture over bathroom mirror	1 40w, WWX or CWX
Bathroom ceiling fixture	1 40w, WWX
Luminous ceiling with 2-foot squares	4 20w, WWX or CWX
Luminous ceiling with 3-foot squares	4 30w, WWX or CWX
Luminous ceiling with 4-foot squares	4 40w, WWX or CWX
Luminous ceiling with 6-foot squares	6 to 8 40w, WWX or CWX
KITCHEN WORK	
Ceiling fixture	2 40w or 2 30w, WWX
Over sink	2 40w or 2 30w, WWX or CWX
Counter top lighting	20w or 40w to fill length, WWX
Dining area (separate from kitchen)	15 or 20 watts for each 30 inches of longest dimension of room area, WWX
SHOP WORK	
Home workshop	2 40w, CW, CWX, or WWX

NOTE: WWX = warm white deluxe; CWX = cool white deluxe; CW = cool white.

All are T12 (1½ inch diameter) tubes.

SIZES AND USES FOR THREE-WAY BULBS

Socket and Wattage	Description	Where to Use
MEDIUM		
30/70/100w	Inside frost or white	Dressing table or dresser lamps, decorative lamps, small pinup lamps
50/100/150w	Inside frost or white	End table or small floor and swing-arm lamps
50/100/150w	White or indirect bulb with "built-in" diffusing bowl	End table lamps and floor lamps with large, wide harps
50/200/250w	White or frosted bulb	End table or small floor and swing-arm lamps, study lamps with diffusing bowls
MOGUL (LARGE)		
50/100/150w	Inside frost	Small floor and swing-arm lamps and torcheres
100/200/300w	White or frosted bulb	Table and floor lamps, torcheres

connector for additional protection, so it won't loosen and fall off due to vibration.

The usual procedure for securing a splice is to solder the joint, either by dipping the twisted wire ends into a solder pot, or applying solder directly, after brushing on the flux or solder paste.

Direct soldering should be done with a quick heating soldering gun, heating the wires enough so that the solder flows into the coil. Use of a blow-torch calls for extreme vigilance to prevent a fire.

If it's necessary to use a torch, the small propane type is handiest and most efficient. No matter which method you use, keep a can of water handy with a small brush and douse any scorched woodwork or insulation by brushing on water.

Tap splices. When one wire is joined into another at right angles, so that the end of one wire is wrapped around a skinned section of another wire, that is a tap connection and should be made only inside a box, with

Wiring an Extra Room

➤ *Make a wiring plan like the one on opposite page when you plan to wire a room yourself. It doesn't have to be as elaborate, but it should serve as a guide when you work and when you order the equipment. Bring it with you and talk it over with the dealer. This wiring plan includes a set of three-way switches to control one light. Electric power is taken from two places, an existing junction box for the room below and from the main panel in the basement, via cable snaked up along the chimney.*

the cable securely fastened into the box to prevent drag which can break the splice.

The wire ends should be at least 1½ inches long, and coiled tightly around the other wire for at least ½-inch. Make sure both wire sections are cleaned bright. Solder the wires and cover with both rubber and friction tape.

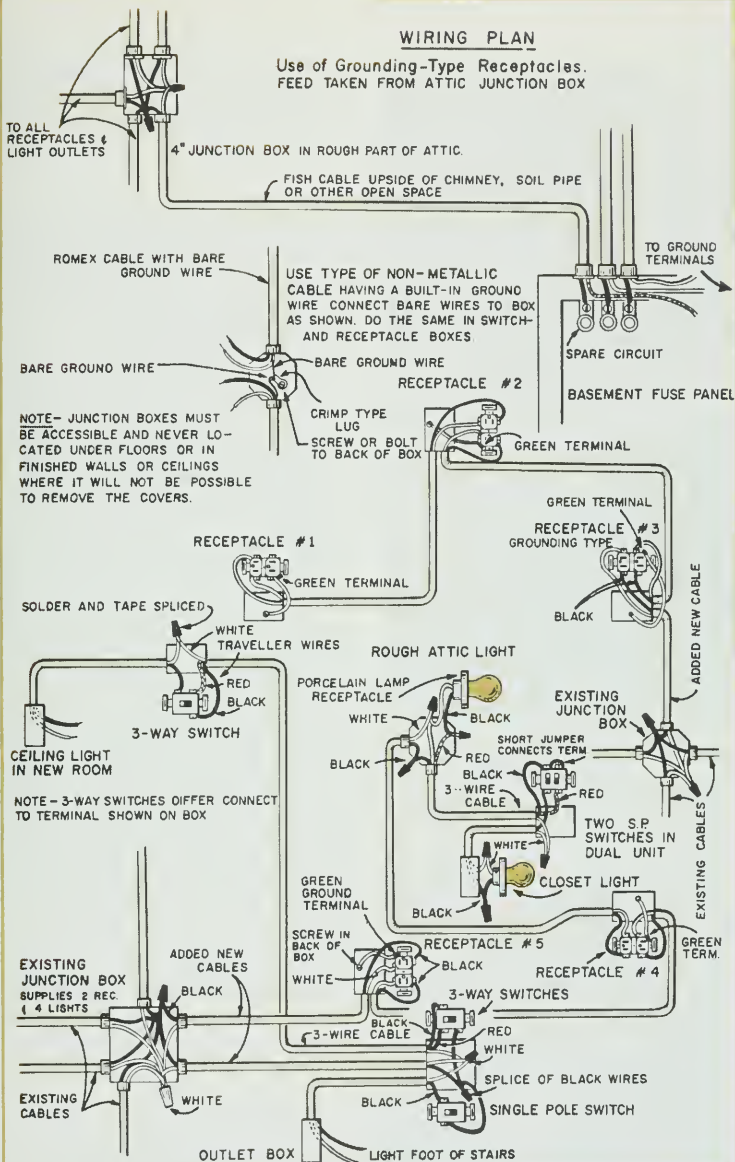
Terminal connections. When solid (unstranded) wire is to be attached to the terminal screws of an outlet, switch or any other device, there are two basic, and simple methods of doing it right. Remember

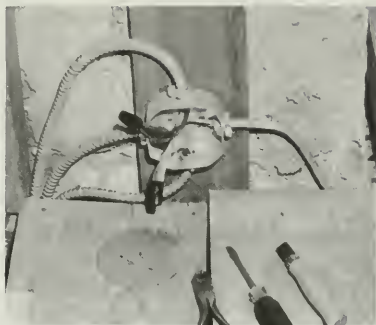
SELECTION GUIDE FOR INCANDESCENT BULBS

Activity	Minimum Recommended Wattage
READING, WRITING, SEWING	
Occasional periods	150w
Prolonged periods	200w or 300w
GROOMING	
Fixture each side of bathroom mirror	1 75w or 2 40w
Cup-type fixture over bathroom mirror	100w
Fixture over bathroom mirror	150w
Bathroom ceiling fixture	150w
Vanity table lamps, in pairs (person seated)	100w each
Dresser lamps, in pairs (person standing)	150w each
KITCHEN WORK	
Ceiling fixture (2 or more in a large area)	150w or 200w
Fixture over sink	150w
Fixture for dining area (separate from workspace)	150w
SHOP WORK	
Fixture for workbench (2 or more for long bench)	150w

WIRING PLAN

Use of Grounding-Type Receptacles.
FEED TAKEN FROM ATTIC JUNCTION BOX





◀ A junction box with splices completed. White wires are spliced with white, and black with black. The splices are made with wire nuts. Once the wires are tucked into the box, the cover can be screwed on.



▲ Connecting an outlet box. Terminals are provided for the white and black line wires. There is also a terminal, marked with a dab of green paint, for the ground. This is a short length of bare wire running from the terminal to the box.



that in all cases, the wire is placed on the screw in the direction that the screw will turn for tightening, that is, clockwise. First loosen the screw as far as it goes (usually the screw end is peened so it won't turn completely out).

If there is ample length of bare wire, wind the wire around the screw in the right direction, so the insulated part of the wire just clears the position of the screw head. Make an almost complete circle of the screw post, then tighten the screw all the way. Finally, break off the remaining length of wire.

Another acceptable way is to cut the skinned end of the wire so there is just enough length to go around the screw. Form a loop on the end, place it on the terminal screw and close the loop tighter with the pliers so it forms an almost closed circle. Then tighten the screw.

Either way, the wire should be centered closely around the screw so that none of the wire extends beyond the screw head. Also, there should be only a minimum exposed section of uninsulated wire, and no free end of wire dangling beyond the screw. All this means that the wire end is securely fastened and covered, with no chance of causing a short.

See also: ADDITIONS, HOME; CIRCUITS, ELECTRICAL; DIMMER, LIGHT; DOORBELL, CHIMES; ELECTRICITY; FLUORESCENT LIGHTING; GARAGE REMODELING; HOME IMPROVEMENT; HOME OWNERSHIP; ILLUMINATION; INTERCOMS; KITCHENS; LAUNDRY ROOMS; LIGHTING; REMOTE CONTROL SWITCHES; SPLICING; WALL SWITCHES; WORKBENCH.

◀ Wiring a ceiling fixture. Simply splice white to white and black to black and turn solderless wiring nuts over the splices.

How the Experts Bend Wood

Use these professional tricks to make sharp curves or spiral bends in wood

YOU'LL HAVE TO KNOW the tricks of bending wood if you are going to build a toboggan, skis, or furniture and cabinets requiring curved boards, veneer or plywood. Gentle sweeps can be negotiated by springing the wood, but special treatment is needed for sharp curves or spiral and helix bends.

The old methods used by carpenters for bending wood are still good for many jobs. In this process, the board to be bent is saw cut with a series of incomplete cuts or kerfs on the inner face across the width, thus reducing the effective thickness of the wood to about one-sixth. As the piece is bent, the tops of the kerfs close, making contact and limiting the bend at any one kerf. Also, the wider the kerf is cut, the sharper the bend per kerf. If the kerfs are evenly spaced and close together, the curve will be uniform, producing an arc of a circle. The wider the spacing between cuts the greater the strain on the wood, and noticeable flats will be apparent on the outside curved surface which must be sanded out to give a smooth continuous curve.

To reduce flats by spacing the kerfs closely, use a saw blade that will produce the narrowest cut or kerf. Spacing of kerfs is determined by making a sample cut in a scrap of wood of the type to be bent, and then laying off the radius of the curve to be

bent from the saw kerf. Clamp the kerfed end to a bench and lift the end of the piece until the kerf closes. Then measure the distance from the bench top to wood at the radius mark. This distance is the spacing unit to use between saw cuts to obtain a curve having a radius of that particular length.

To cut uniformly spaced kerfs, drive a nail into the miter gage extension of a table saw or the fence of a radial saw at a distance from the center of the blade thickness equal to the required kerf spacing. When sawing the kerfs, move the board over so that the nail is between the edges of the last cut kerf. After the length of the board to be bent is kerfed, bend it around the shelf or other supporting member it is to be fastened to, and glue, nail or otherwise fasten it. Sand out any flats resulting from bending.

To make the bent piece self-supporting, brush glue over the kerfed side and work the glue into the kerfs with a knife blade. Then bend the piece to the desired curve, spanning the ends with a clamp, a strip of wood with limiting blocks nailed to it, or a loop of rope twisted to shorten it. Wipe off squeezed out glue with a damp cloth. The kerfed face and edges can be filled with wood putty and sanded smooth, or veneering will hide the kerf joints.

The narrow kerf made by a band saw blade makes it an excellent tool for kerfing. Clamp a stop block of 2-inch stock, a little wider than the width of the stock to be kerfed, to the band saw table, placing it behind the blade where it will limit the depth of cut to the required amount in the piece

woodburning stoves: see stoves, woodburning

wood, campfire: see campfires

wood finishing: see finishing, wood

wood, fireplace: see firewood

wood floors: see floors

to be bent. Make a starting kerf in this piece and drive a nail in the stop block to locate the position of the second kerf. Enter this pin successively in the kerfs just cut to maintain uniform spacing.

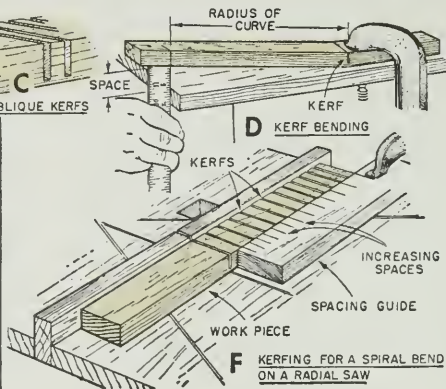
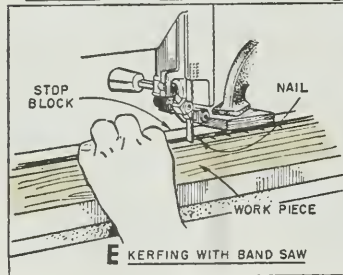
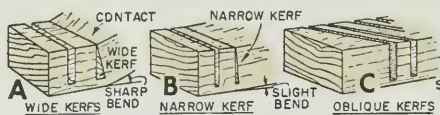
Elliptical and other variable curves are made by varying the spacing between the kerfs. While such spacing can be determined by involved mathematical computations, the most practical method is trial and error. By simply adding a little to each successive space, such as $\frac{1}{32}$ -inch, a spiral form can be made. To make a spacing guide, lay out increasing spaces on a strip of wood and clamp it to the saw table. For example, increase each space by $\frac{1}{32}$ -inch over the preceding one. Place the end of the work piece at the first mark, saw a kerf, and move to the next mark for the second cut and so on.

To duplicate a spiral curve, estimate the radii at various points and test the spacing with cuts in scrap wood. Then mark the spacing of this cut on the piece to be kerfed and locate the spacing for the other kerfs, increasing them as the curve flattens or becomes larger and reducing the spacing as the curve grows sharper. It is better to have too many kerfs than not enough, as the piece can be painted with glue, bent around a form, and left until dry. Veneering the

kerfed side adds considerable strength to the piece, particularly when the kerfs don't close tightly.

If a strip of wood is wound spirally around a cylinder, a helix is formed. For such a bend, the kerfs must be made at an angle rather than at 90° with the edge of the strip. The rate of climb, or lead, of the helix determines the kerf spacing of a piece of given width. The angle of lead is found by dividing the distance of rise in one revolution by the circumference of the cylinder, or simply by dividing the rise "h" of half a revolution by pi (π) R, or roughly $3\frac{1}{2}$ times the radius. If the cylinder form is at hand, the circumference can be obtained by wrapping a strip of paper around the form. The angle of cut with the square line is the same as "a," the angle of lead.

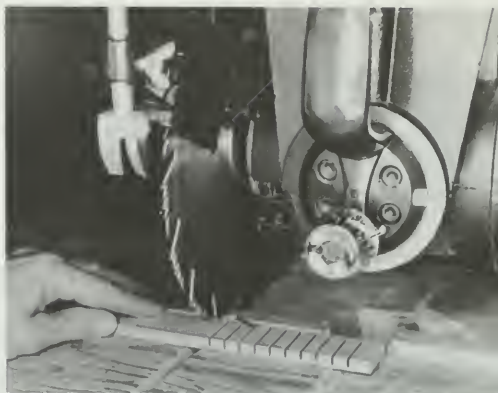
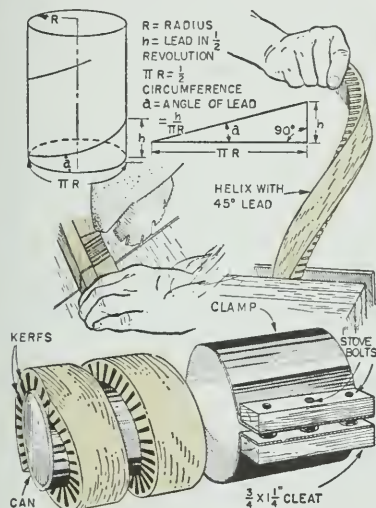
To kerf with a table saw, set the miter gage at the angle of lead. On a radial saw, swing the track arm to the angle, using a nail for a spacing pin as for square kerfing. After sawing the kerfs, bend the spiral around a form. In many cases a tin can will serve. Remember that the spacing of kerfs must be according to the inside diameter of the helix, or the radius of the form cylinder. A convenient clamp can be made from sheet metal cut to fit around the helix, with edges



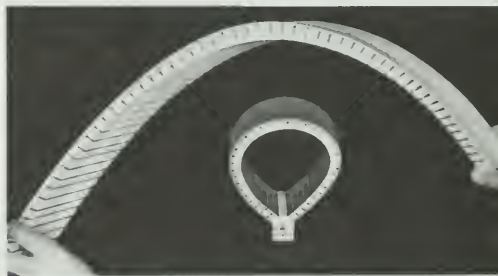
How the Experts Bend Wood

bent out and bolted to strips of wood, which act as clamping ledges. Apply glue to the kerfs, bend around the form, and secure with the clamp. For a substitute clamp, wind a small rope around the work as it is bent.

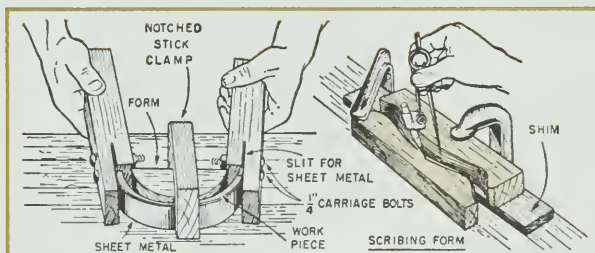
Commercially, solid wood is steamed to soften or plasticize it for bending, and is then bent to shape in a power press. The small shop can steam small strips of wood by inserting them in a length of transite pipe gutter downspout, or similar container. Just cap one end of the container and seal a tea-kettle spout into the other end by wadding



▲ Cutting kerfs with a radial saw. A nail driven into the saw-table fence serves as a guide to space the cuts evenly.



▲ Circular and oval shapes can be formed if kerfs are cut at 90 degrees to the length of the stock. The spiral twist is formed by cutting the kerfs at an angle to the long axis of the wood.



3142

▼ A common method of forming curved pieces is to laminate and glue thin strips of wood and bend them in a form until the glue sets. ►

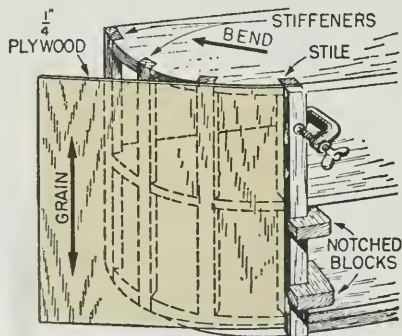


steel wool around it. A hotplate or torch will heat the water. More success can be expected if the piece is boiled. Small pieces can be boiled in a baking pan. A minimum of one hour of boiling per one inch of thickness is required.

Select wood carefully for bending. Use only clear, straight-grained material free from checks or other defects, and coat the ends with aluminum paint to prevent too much soaking and softening there. On sharp bends there may be breakage, in spite of careful preparation, so have a spare piece

on hand. While the wood is steaming or boiling, prepare the bending forms. Easy bends, such as hoops, can be made with stakes driven into the ground. But a small tight bend requires support and force from all directions. The elements of the press shown are two handles cut from 2 x 2-inch lumber, with notches to provide pressure lugs for the ends of a strip of sheet metal, and extensions beyond the lugs to reinforce the bent ends. An inside form cut from wood to the curve of the inner face of the strip is held in place by a notched-stick clamp which clasps over the sheet-metal band.

Cut the metal band to such a length that when inserted in the handle slits and bolted, the lugs will be a very little closer together than the length of the piece being bent. Remove the piece from the water, place it in the press quickly, bending the handles back enough to seat its ends, and put the inner form in place with the notched stick. Bend the wood by swinging the handles together until a little past parallel, and hold with a cord loop. If there are any places where the wood springs away from the inner form,



SHEATHING CABINET CURVE

How the Experts Bend Wood

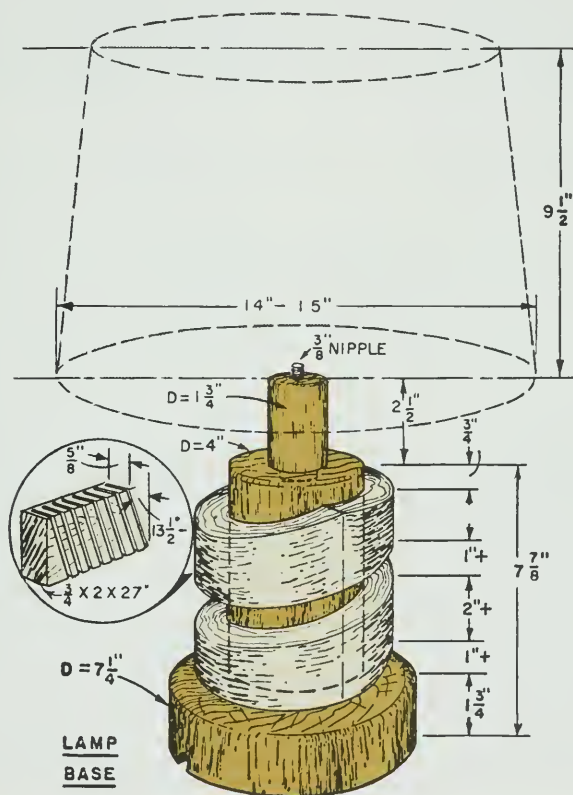
3143

add a clamp to force it into position. Let dry in the clamp for 24 hours or more. As there will be some spring-back, cut the form so that you can over-bend the piece.

Nearly-dry bends can be made by lamination, in which strips of wood are glued together in a curved form and held in the form until well dried. To make the form, lay out on a piece of lumber of necessary thickness the curve of the piece desired, and bandsaw to shape. File or sand smooth any irregularities of cutting. Shim this piece up from the bench top with a strip of wood

and clamp it in position. Clamp the other form piece beside the first, separated $\frac{1}{8}$ -inch less than the thickness of the finished work, and with scribes or compass set to the thickness of the work piece to be clamped, scribe a line on the second piece. Then band saw and smooth this form piece.

When bending a laminated piece, first coat the joining surfaces of the strips with glue, even up the edges as they are laid together, and clamp between the two forms. Allow the assembly to dry thoroughly, re-



move from the forms, and then cut the edges to the size required for the project.

Three-ply $\frac{1}{4}$ -inch fir plywood can be bent around a curved corner with a radius as small as 10 inches if applied with the grain of the outside plies running at right angles to the bend and the outer ply well dampened with water to expand it. In addition to the shelves, use 1 x 2-inch stiffeners with faces rounded to match the curve and notched into the shelves. Begin by gluing and nailing one edge to the center of a stile placed at the beginning of the bend, reinforcing it with a strip clamped outside with C-clamps or pieces of 2 x 4-inch stock notched to fit tightly over the assembly. Gently spring the plywood around the curve, nailing as you go, and finish by gluing and nailing the back edge, finally trimming the plywood flush with the back.

If nails would be objectionable, contact cement will do the job. Mark the shelf and stiffener positions on the back of the plywood and paint on the cement. Also coat stiffeners and shelf edges. If wood absorbs cement, apply a second coat on all joining surfaces. Wait until cement dries before applying plywood. The cement should appear as a continuous glossy film when dry. After a wait of 30 minutes or more, or when a piece of paper pressed against the cement does not stick, apply the plywood.

Since touching of the two cemented surfaces together gives instant bond, care in placing plywood is important. Clamp a guide strip to the starting stile, place the starting edge of the plywood against it, and swing the sheet against the cabinet, again working from the starting edge forward. Rub and tap into place, and tap all cemented areas with a hammer and block to make sure of good contact.

When the curve is too sharp for $\frac{1}{4}$ -inch or thicker plywood, the back of the sheet can be kerfed to help bend it. Hardwood plywood, having a thick core, is likely to be stiffer than fir plywood, requiring a larger

radius for bending. When a surface of figured hardwood is desired, it is better to use two or more thicknesses of $\frac{1}{8}$ -inch three-ply plywood. Nail, or brad and glue into place a sheet of inferior plywood as a foundation. Work out flats or unwanted sharp bends and coat it with contact cement. Coat the back of the figured plywood sheet and apply as described before. With thicker facings, apply $\frac{1}{4}$ -inch fir plywood as a base, kerfing it if necessary, and truing the face.

Bent wood can be used in many interesting designs, as in the lamp base shown. The core of this assembly is a 4-inch cylinder of dark wood, such as mahogany, joined with a tenon to a mahogany base, with a helix of blond wood, such as ash plywood, winding around the mahogany base. Kerf the back of the ash strip $\frac{5}{8}$ -inch deep, inclining the cuts with the vertical a scant $13\frac{1}{2}$ degrees. Apply glue to kerfed side and form it over the core which must first be covered with two thicknesses of paper taped in place. When the glue on the helix is dry, trim off the ends flush with top and bottom of core leaving $1\frac{1}{2}$ turns of the strip. Fill the edges of the kerfs with wood putty, let dry, smooth, and glue the helix in place, around the core. Paint the edges to match the light wood. Bore the base with a $\frac{3}{8}$ -inch bit to pass the electric cord, and gouge a groove in the base to bring the cord outside. Screw a $\frac{3}{8}$ -inch brass nipple into the top, surmounting it with the socket and shade harp. A shade of the size shown in the drawing is about the right size for this lamp base.

Finish with or without wood filler, as desired. Apply three or four coats of a clear finish and rub down with #000 steel wool. Brisk rubbing with a soft cloth increases the gloss.

See also: BOAT BUILDING; BOAT BUILDING PROJECTS; RACING BOAT; RADIAL ARM SAW; RUNABOUTS; TABLE SAW; TOOLS; TOOL TECHNIQUES; TRAINING BOAT; WOODWORKING.



How to Finish Edges and End Grains

The edges and end grains of wood, especially plywood, present difficult problems, but you can solve them with these woodworkers' tips

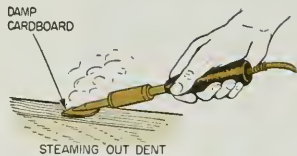
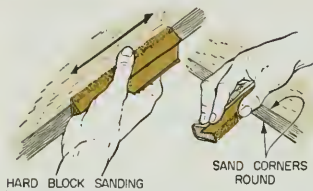
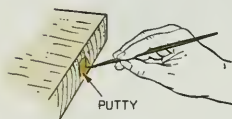
EDGES AND ENDS of table tops, shelves, cabinets and counters pose special problems for the woodworker. Often the edge looks too thin or too plain; the figure of the wood on the end grain doesn't match the top, or if of plywood there are alternating stripes of end and edge grain pitted with bottomless holes. Success in overcoming the stubborn edge depends not only on the skill in tooling and choice of materials, but to a great extent on the character of lumber and its built-in tendency to shrink or swell as humidity changes.

The edge of solid wood is the easiest of all to condition. It can be molded with a

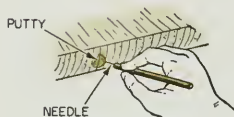
sharp cutter, or planed straight and square. A little sanding will then ready the edges for applying finishes. This is assuming, of course, that there are no dents or torn grain to mar the edge surfaces. Many shallow bruises can be leveled by steaming. Just lay a strip of moist blotter or cardboard over the scar and press with a hot soldering iron or flat iron, and the crushed wood will swell. If one application doesn't do it, a second or third probably will.

Perhaps your table top is already sized to dimensions, but pits, voids and scratches still show. If you are going to finish the project with an opaque paint, a wood putty

3146

DAMP
CARDBOARDSTEAMING OUT DENTHARD BLOCK SANDINGSAND CORNERS
ROUND

PUTTY

PAINTING RINGSRASPING WORN SPOTS

NEEDLE

MATCHING PORESCHECKING END*How to Finish Edges and End Grains*

is your solution. Apply with a putty knife and a sliding motion to promote adhesion. Fill deep holes a layer at a time for quick drying and to prevent cracks. Surfacing putty is especially good for shallow dents and for leveling off the cross-grooves left by a chattering plane. If you use linseed-oil putty, remember that it shrinks and always takes several days to dry.

Padded sanding blocks are not for use on edges, as they round them and rub off the corners. Wrap a piece of sandpaper around a flat, unpadded block and guide along the surface. Work down from # $\frac{1}{2}$ -grit in flint paper to #00 for ordinary finishes on soft wood, and #000 or finer for high-grade work on hardwood. Since a brush will wipe paint off sharp edges, always sand the sharp corners, rounding them off to about the size of a mechanical pencil lead.

Naturally, perfect surfaces, smooth in themselves, are the best for transparent finishes such as natural, blond, or stained work coated with varnish, lacquer, or plastic. Use care when sawing and planing the work piece to prevent splintering of the end-grain. Follow with scraping or thorough sanding. If dimensions are reached before dents disappear, puttying must be resorted to even for natural wood finish work.

Successful puttying for transparent finishes requires matching of color. Wood filler is available in tubes in various colors, which can be darkened in tone by the application of thin stain or even a tint from an ordinary water-color box. Remember that water colors dry light, and a second coat may be needed. Paint in grain to match over dried putty.

Color alone won't disguise putty fillers. If you want to go to the trouble to match the texture as well, you can hide the patch from almost any eye. End grain on open-grained woods such as mahogany or walnut can be imitated by pricking end pores with a needle set into a dowel stick for a handle, the pattern of wood being followed. For

How to Finish Edges and End Grains

side grain, cut small slashes with a knife-point. These indentations will take wood filler like genuine open grain.

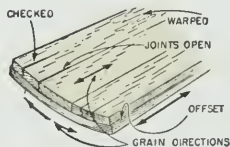
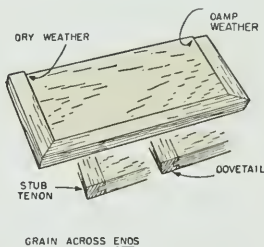
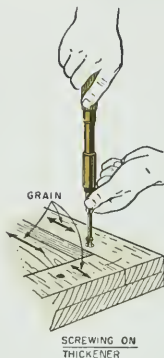
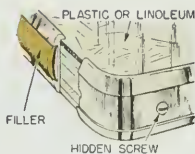
If you go in for provincial furniture you may want to give a worn effect to edges by rasping off corners and arrises at places where arms rest, or where feet are placed on stretchers. Smooth the worn spots with a cabinet file and lengthwise sanding. Checks and other cracks, badges of age, are readily engraved with an ice pick. Jog the point occasionally to make the check realistic.

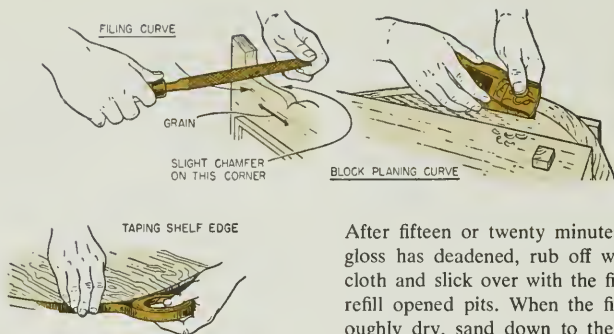
You can reduce material costs and lighten the weight of a table by thickening the top edges with cleats glued, and nailed or screwed, to the underside of the top. Finishing will disguise the glued joints. However, provision for shrinkage and swelling of solid stock must be made. Don't fasten the cleats so the grain is at right angles. If you do, one or all of the four things will happen. The top will become a trough when it shrinks and hump up when it swells; joints will open at the ends, or boards will check; the top, sliding on the thickening strips, will break the glue and split the paint at the joints; the ends of the side strips will be forced out.

The proper procedure is to cut the thickening strips across the grain for ends. Then they will shrink or swell with the top. Paint or otherwise seal the inner edges to prevent checking.

It is true that there are instances where strips are applied across grain in hope of preventing warping, and to hide end-grain. These are admissible if tongue-and-grooved to the piece, especially if dovetailed to keep them from slipping off, and glued only at the front. The solid piece, being free to expand and contract, will in time retreat at the back if it shrinks or will expand beyond the end piece if it swells. This construction is sometimes used in mantel shelves, built-in chest-seat lids and the like.

Curved and scroll-sawed edges on solid





wood present their own peculiar difficulties. Design the edge without prominent cross-grained points that split off easily and are a menace to the faces of playing children. Fancy curves are best trued to the outline with a cabinet file. Hold the piece in a vise and chamfer the far corners with the file, to prevent splintering. Push the file forward holding it square with the sides while holding the stroke sidewise with the grain. Do not saw back and forth with the file in the same spot.

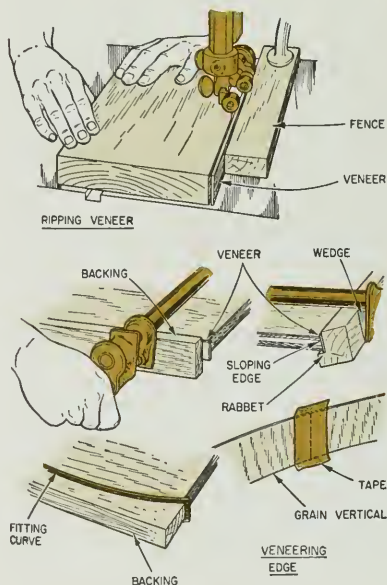
Sand in a similar fashion with the sandpaper wrapped around a cylinder. Curved edge table tops, like those with straight edges, having gently swelling or hollowing edges show irregularities plainly. A good deal of smoothing on convex curves can be done with a block plane set for a fine shaving. Much truing work can be done with coarse sandpaper over fitted blocks, following with the finer grits.

For inexpensive shelf edge treatment waterproof colored tape can be used. Being flexible, it can be used on curved as well as straight edges. Tape is available in $\frac{3}{8}$, $\frac{3}{4}$ and 1 $\frac{1}{2}$ -inch widths and various colors.

Plywood edges can hardly be considered ornamental, and normally are camouflaged in some manner. For a painted finish putty open holes, sand, and coat with paste filler ordinarily used on open-grained woods.

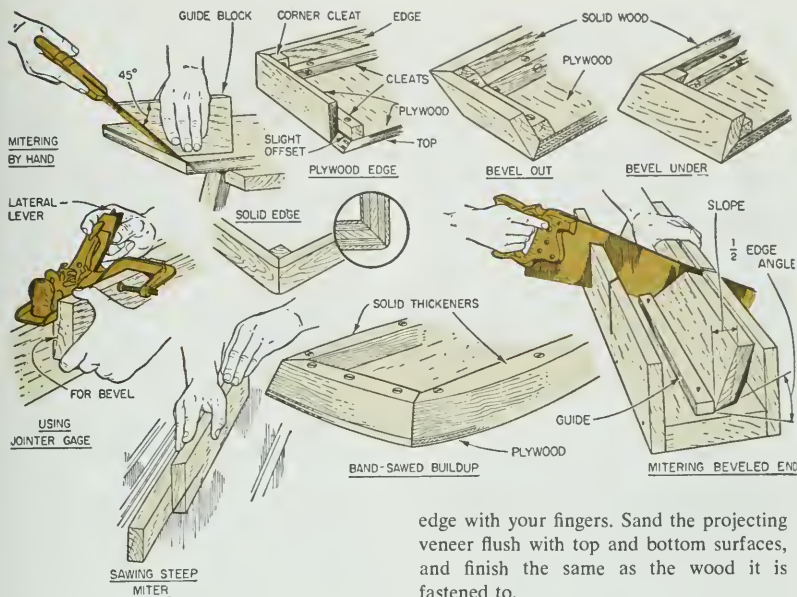
After fifteen or twenty minutes, when the gloss has deadened, rub off with a rough cloth and slick over with the finger tips to refill opened pits. When the filler is thoroughly dry, sand down to the wood, and apply finish. Much furniture coated with transparent blond paints has edges painted solid color to match. If the edges are beveled under, the cast shadows aid the subterfuge.

A simple treatment of hardwood plywood edges is to band them with veneers. These narrow strips can be cut on the circular or band saw, either from solid



How to Finish Edges and End Grains

3149



stock or by sheering off the face veneers of narrow sections of the same plywood.

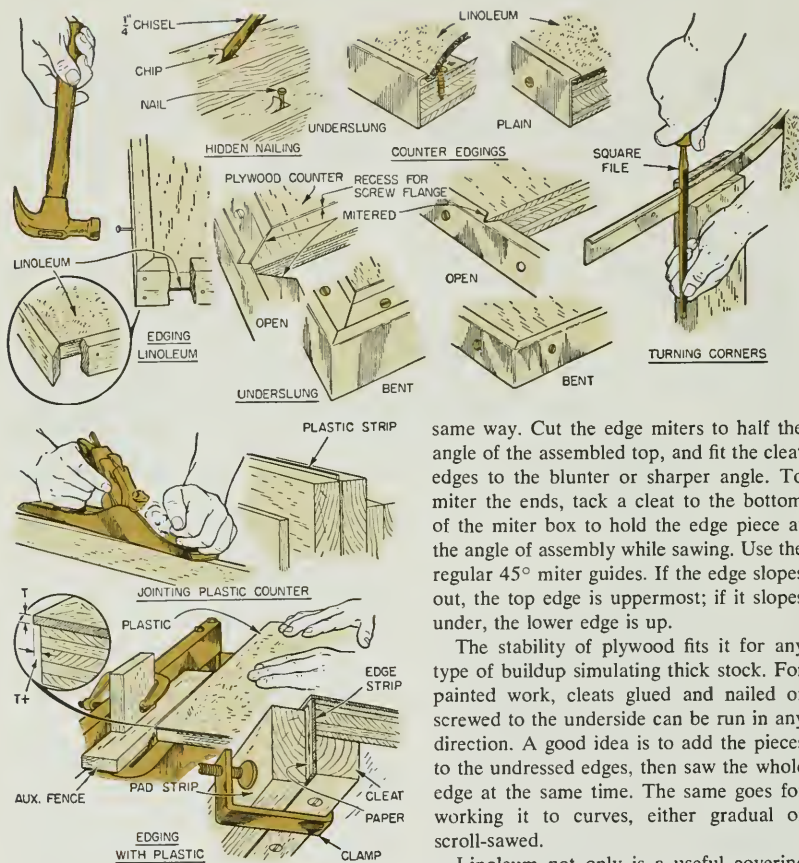
Apply them to the two ends with glue, using stiff strips of wood under the clamp jaws. When dry, trim the edges with block plane and sandpaper, sand the edges and ends flush, and apply the edge veneers. On sloping edges, use rabbeted strips to keep them from slipping off under clamp pressure. On curved edges, back the veneers with curved clamping blocks fitting them accurately. Veneer bands with vertical grain are pieced together with tape and applied like the others, either all around the table top or on the ends in combination with horizontal grain at the edges.

Tapes of veneer in various woods simplifies the finishing of edges. Available nationally in a variety of woods, they are ready-coated with contact cement on the back and are applied by unrolling and rubbing on the

edge with your fingers. Sand the projecting veneer flush with top and bottom surfaces, and finish the same as the wood it is fastened to.

One of the best modern treatments is to face the edges with plywood of the same kind as the piece itself. Miter the edges to be faced at 45° either on a circular saw or by hand. If you distrust your ability, press a guide-block against the saw as you cut. Miter the edge pieces. A touchup with a plane is advisable, and here a block clamped to the cheek of the plane will help to keep the angle true. It is useful either for squaring or for planing at a bevel. The face of the block is cut out to suit the occasion. Miter the ends of the edge facings.

To assemble the parts, bore and countersink 1 inch cleats in two directions to receive flat head screws, gluing and screwing them to the underside of the top, a trifle behind the miters. Coat the joining edges with glue and attach the edges, finishing with the corner cleats glued and screwed. In a cabinet top, the cabinet body or sides may take the place of the blocks. Break the



arrises gingerly. If you have trouble closing the miters, put bar clamps across the top, using protective strips under the jaws, as in gluing on veneers.

The same methods can be used with solid-wood edges mitered to the plywood. Some edge-dressing is possible after assembly, and the arrises, especially of the edge corners, can be rounded materially.

You can build up beveled edges in the

same way. Cut the edge miters to half the angle of the assembled top, and fit the cleat edges to the blunter or sharper angle. To miter the ends, tack a cleat to the bottom of the miter box to hold the edge piece at the angle of assembly while sawing. Use the regular 45° miter guides. If the edge slopes out, the top edge is uppermost; if it slopes under, the lower edge is up.

The stability of plywood fits it for any type of buildup simulating thick stock. For painted work, cleats glued and nailed or screwed to the underside can be run in any direction. A good idea is to add the pieces to the undressed edges, then saw the whole edge at the same time. The same goes for working it to curves, either gradual or scroll-sawed.

Linoleum not only is a useful covering for kitchen counters but also for game and work tables. A plywood or other non-shrinking base is necessary, and the edging must protect the soft edges of the linoleum. If you like a wooden border around it, nail and glue an edging of 3/4-inch stock to the edges, mitering the corners. Keep the upper edge flush with the linoleum by feeling the joint with the thumb as the nailing proceeds, because any planing after assembly may trim a shaving from the linoleum,

How to Finish Edges and End Grains

removing its bloom. A neat little trick to hide the nail heads when natural finish is to be used, is to raise a chip with a 1/4-inch chisel and drive a nail into the hollow. After setting, glue the chip down, covering it with a bit of waxed paper and a weight. When dry, dress and sand flush. If a crushed place shows at the starting end of the cut, raise it by steaming.

Metal edgings are commonly used with linoleum installations. Easiest to apply is the over-the-top or plain type. Trim the linoleum flush with the counter edge and press the metal trim in place, forcing the flange down against the linoleum with the left thumb while driving the oval-headed screws. Such metal edgings are stainless steel, and stiff, but they bend well around corners if the flanges are nicked in with a square file, forming miter cuts that close neatly when the edge is bent at the corner. Try to locate screw holes near the corners.

Underslung edging hides the screws by putting them through a horizontal face resting on the counter or table top. Cornering is done by mitering, the screw member being nicked in with a hacksaw. A tight fit is unnecessary. The top flange is filed afterward. The linoleum edge is slipped into the pocket after the metal edging is in place. On drainboard installations it is well to run a ribbon of mastic under the top flange to seal the joint from water.

The decorative metal edging is a dovetail-recessed aluminum molding of the over-the-top type held with face screws. A crowned plastic strip, available in various colors, is pinched together at the edges and snapped into the grooves, concealing the screw heads. This trim will bend smoothly around curves down to a radius of 1 inch. A good method of application is to screw a straight section in place first, then bend the strip with your hands, persuading it with a rubber mallet or a padded wooden one. Run the end of a stick along the loose edge of the plastic strip to force it into the groove.

Over-the-top metal edges are often used for plastic sheets surfacing table tops and counters. They are applied as for linoleum. If you admire those plastic counters in which figured veneers are sealed under clear plastic, having facings of the same material instead of metal bindings, there is a method well suited to home uses. Joint the edges of the counter or table top with a sharp plane swiveled to give a skewing cut against the plastic. Hacksaw an edge strip 1/16-inch wider than finished width, clamp it between two boards, and joint the upper edge. Now set up the circular saw with a two-piece auxiliary fence clamped to the rip fence. Raise the saw blade to cut a recess along the edge of the wood, and just grazing the underside of the plastic. Shift the fence to trim out a rabbet exactly as wide as the plastic thickness. After cutting, clean up with a mill file, removing the glue from the plastic.

Try the plastic strip in place, clamping it lightly with a wood strip over a protective piece of paper. Inspect the joint with the counter plastic, and make corrections. Then coat plastic and wood with glue and clamp firmly in place. If the edging cants out beyond the edge of the counter plastic, span clamps across the top, tightening enough to draw the strip in flush. When dry, dress the lower edge of the strip flush with the bottom of the cleat.

Plastic edges can be applied with contact cement. Coat the edge and the back of the plastic strip with cement, using a brush or serrated spreader, and allow to dry until a piece of paper, pressed against the adhesive, does not stick. Apply the strip to the edge of the wood with paper between, leaving a narrow line of cement exposed. When the plastic is aligned, press it into place at the center, drop out the paper, and rub toward the ends with your fingers. Run a roller along the strip, and trim as required. M.E.

See also: HAND TOOLS; MOLDINGS; POWER TOOLS; TOOLS; TOOL TECHNIQUES.

The Basics of Dadoing and Rabbeting

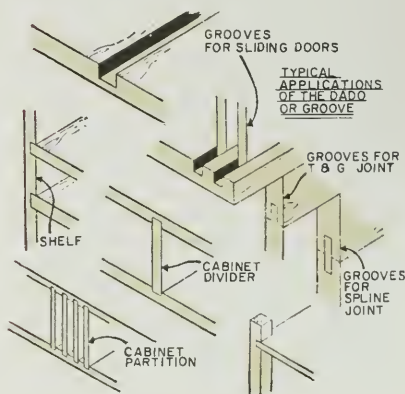
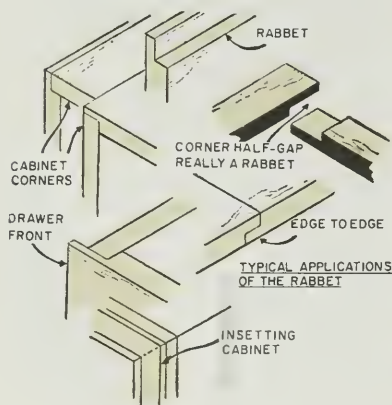
These techniques of joinery make strong joints, and with their variations, are widely used and simple to execute

ALTHOUGH THERE ARE many types of fancier joints, the dado and the rabbet and a few variations of each rank high among those used most often. The heavy reliance of these basic forms is justified because they are easy to cut, make a strong joint, and have a variety of applications. They are similar in that each requires a cut which is wider than you can make in one pass with a regular saw blade. The dado is a U-shaped cut made across the grain. The

same cut made with the grain is called a groove. The rabbet is L-shaped and is called a rabbet regardless of whether it is formed with or across the grain of the stock.

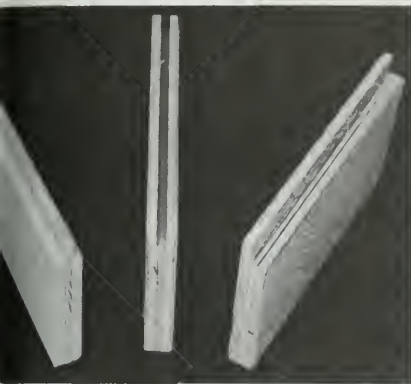
Actually, if you set a regular saw blade lower than the thickness of the stock you are using and make repeated passes to widen the normal kerf you'll end up with a dado or groove. In a similar fashion, when you work along the edge or on the end of a piece of stock, you can form a rabbet.

There is also a two-pass procedure for forming rabbets. The first pass which forms the shoulder of the rabbet is made with the stock flat on the table and with blade projection set to the depth of the cut required. The second pass, as shown in the photo, is made with the stock on edge, with rip fence and blade height set so the two cuts will



The Basics of Dadoing and Rabbeting

3153



▲ Tongue-and-groove cuts (left) and a rabbet cut (right). Tongue is simply two back-to-back rabbets.



▲ Final cut on a two-pass rabbet. First shoulder-forming cut is done with stock held flat on the table.



▲ Both dados and rabbets can be cut with a regular saw blade by making a series of repeat passes.



▲ Cutting twin grooves for sliding cabinet doors. If depth of cut is very deep, it is best to do it in stages.

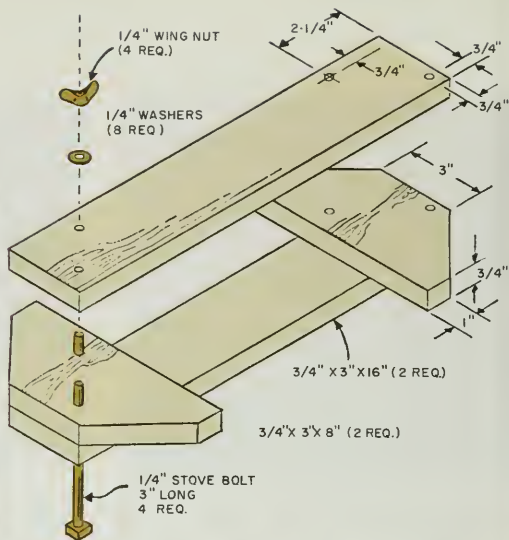
mate. In each case the operations are more time consuming than they should be and require greater care for accuracy when many duplicate pieces are needed. That's why most craftsmen acquire a dado-cutting

table-saw accessory for operations of this nature.

The most common of these is a dado assembly which consists of two outside blades and an assortment of chippers which

3154

▼ For the sake of accuracy, use the miter gauge stop arm or a jig to position a piece of work when making back-to-back dados. ➤



▲ "Stopped" dado does not run the full width of the work. Shape the inserted piece to fit the dado's radius.



▲ To make a "stopped" dado, clamp a piece of wood to the saw table to stop work at the desired point.

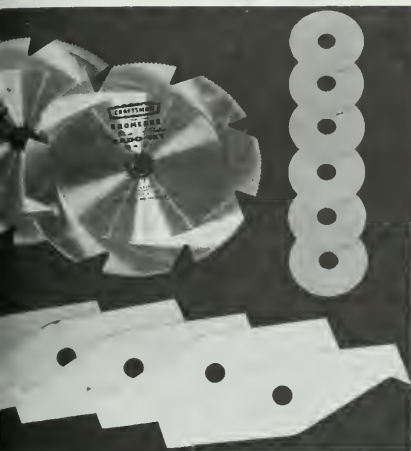
are placed between the blades. This makes it possible to vary the width-of-cut to suit the work. Thus you can form a U-shape from 1/4-inch wide up to about 1 3/16-inch in one pass, and once the dado assembly is set

you'll know that every cut you make with it will be the same.

"Wobble" dados are designed to deliberately throw the blade out of line so that it moves from side to side as it turns and

The Basics of Dadoing and Rabbeting

3155



◀ A common dado cutter consists of two outside blades and an assortment of chippers. Use cardboard washers as shims to adjust width of cut, if necessary.

▼ L-shaped rabbet cut is made in side of stock. Its width must be equal to the size of the piece it must fit.



▲ Stop block clamped to the miter gauge extension permits accurate cutting of identical rabbets.

▲ Illustration shows how a tenon is finished by making repeated passes until all the excess stock is removed.

this makes a wider-than-normal cut. The amount of offset determines the width of the cut.

The quick-set dado tool falls between the assembly type and the wobblers. Depth of

cut here is limited to about $\frac{3}{4}$ -inch (which is not critically limiting). The width of the cut is set by turning the hub to the specific dimensions marked on the tool.

Most times, when cutting grooves—since

you'll be feeding in line with the longest dimension of the stock—the rip fence is used as a guide. To be sure that tool projection above the table—which determines the depth of the groove—is correct, it is a good idea to make a trial cut in some scrap stock and to check this before cutting your good material. When working with a wobbler-type dado, be especially careful about measuring from cutter to fence. Again, it's a good idea to make trial cuts first.

Back-to-back dados are often required in cabinets and on projects such as bookcases. To be sure that the dados are in perfect alignment you can use a jig. This is simply a clamping device which can ride along the edge of the saw table. After the first dado is cut it's a simple matter to flip the jig over and make a second pass. This jig will take stock up to 10 inches wide, but it can also be made longer. It will handle stock $\frac{3}{4}$ -inch thick and up. For thinner stock use a scrapwood pad to achieve the clamping action.

The "stopped" dado is used when you

✦ A rip fence facing comes in handy for many kinds of rabbeting. Bolt it to existing fence.



The Basics of Dadoing and Rabbeting

don't want the U-shape to appear on the front edge of the project—at the front of a bookcase, for example. The easiest way to do this is to shape the shelf edge to conform to the radius left by the dado cutter. Thus the dado does its job but does not appear unsightly. To "stop" the dado when cutting on the saw merely clamp a stop-block to the saw table so that the work can't be advanced any further than that point. This will also assure that all the dados you cut will be exactly the same length.

The edge-rabbet, like the groove, is cut by using the rip fence as a guide. Whenever possible work so that the body of the piece is between the fence and cutter. Be sure to check dado projection carefully to guarantee correct rabbet depth. When it's not possible to place the work between the fence and the blade (the stock may be too wide or too long), the rip fence should be equipped with a wood facing. Then it will be possible to position work and cutter without interference from the fence. When cutting a rabbet across the narrow edge of the stock, use the miter gauge to advance the work.

When cutting many end rabbets on similar pieces, make a miter-gauge jig to assure accuracy. This is simply a length of stock screwed or clamped to the miter gauge so that a small scrap block can be clamped to it to act as a stop and so position the work for the pass.

Very wide rabbets will require more than one pass. An example of this is when a stud tenon (which is actually two back-to-back rabbets) is required. Your best bet is to use the fence as a stop to position the work for the first pass. This is like forming back-to-back dados. Then the remaining material is removed by making as many additional passes as necessary.

R.J.D.

See also: CABINETS; DOWELS; DRAWERS; JIGS; RADIAL ARM SAW; TABLE SAW; TOOLS; TOOL TECHNIQUES.

All about Joints and Joinery

**How to make the
type of glued joints that will
strengthen and improve any
woodworking project**

IN WOODWORKING, the making of well-fitted and properly constructed joints is of utmost importance. Although nails, screws, bolts, and other types of fasteners are used extensively in the construction and maintenance of a house, the home craftsman should also be familiar with the common joints used in woodworking and with the proper methods of making them before he attempts to construct, alter, or repair furniture or cabinets.

The common joints in woodworking are the lap, butt, rabbet, dado, mortise-and-tenon, dovetail, miter, and tongue-and-groove joints.

Lap joints. The types of lap joints are the half lap, halved cross lap, end or corner lap,

and middle half lap. They are used in the construction of book shelves, stretchers on chairs, easels, kitchen cabinets, and in similar projects. The middle half lap joint is the most commonly used. This joint is laid out by superimposing one piece of the wood upon the other to mark accurately the width of each cut. Then clamp the two pieces together in a vise, and with the try square draw the lines for the width of this cut accurately square across both work edges. Remove the work from the vise, and again using the try square, square the shoulder lines of both the face and the edge of the work. Gauge and mark the depth of the required notches with the marking gauge.

Again secure the work in the vise, and saw down to the required depth with the backsaw. Be sure to make the saw cuts on the waste part of the stock. If the notches are more than $\frac{3}{4}$ -inch in width, make several cuts to facilitate the removal of the waste material. Chisel down to the gauge line on each side of the notch. To prevent breaking the grain of the wood and to produce a clean, smooth cut, the chisel should be slanted outward very slightly. The final step in the making of the middle lap joint is to finish the cut to a uniform depth.

Butt joints. The butt joint is the simplest joint and is the only one in which nails or screws must be used. It is used only for rough construction. Though it is extremely simple to make, test the edges to be joined for absolute squareness with the try square before the pieces are fitted together.

Rabbet joints. Rabbet joints are formed by recesses or rabbets, cut out on the edges of the work so that they may be fitted into each other or secured further with a spline fitting into them. Rabbet joints are used in the construction of cabinets, table tops, and similar projects. The rabbet joints commonly used are the rabbet on end and the

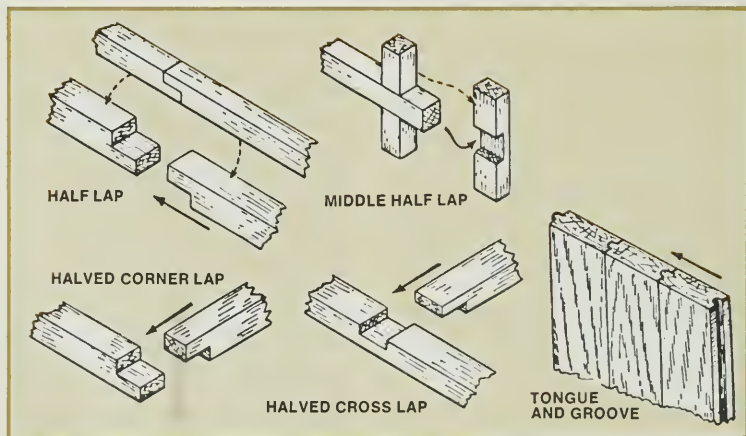
All about Joints and Joinery

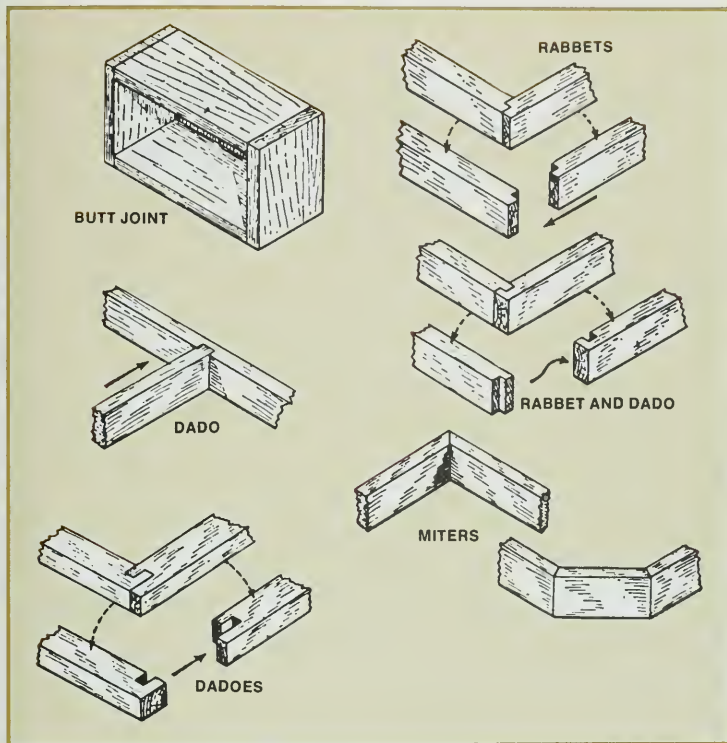
rabbet on edge. The shiplap and the rabbet and fillet are two variations of the lap joint.

To make a rabbet on end, lay out the joint by squaring a line for the side or shoulder of the joint across the face of the board and down the edges. This line should be as far from the end of the board as the thickness of the joining piece. Then gauge the required depth of the rabbet, and mark the lines on the two edges and on the end with the marking gauge. Cut out the material.

Dado joints. Dado joints are grooves cut across the grain of the board into which a second piece of wood is fitted accurately. They are used in the construction of end tables, cabinets, bookcases, and similar projects. A housed dado joint is one in which the entire end of the second piece fits into the dado, or groove. In a stopped or gained dado joint, the dado does not extend entirely across the face of the work. Other types are the dovetail and shoulder-housed dado.

To lay out a plain dado, set the board to be housed on end on the face of the board in which the dado is to be cut, and mark the width of the dado accurately on the





face of the board. Square lines with a try square across the face of the board through the marks and down both edges. Then mark the required depth with a gauge, connecting the two marked lines. Using a backsaw, make the necessary cuts; remove the waste wood with a chisel.

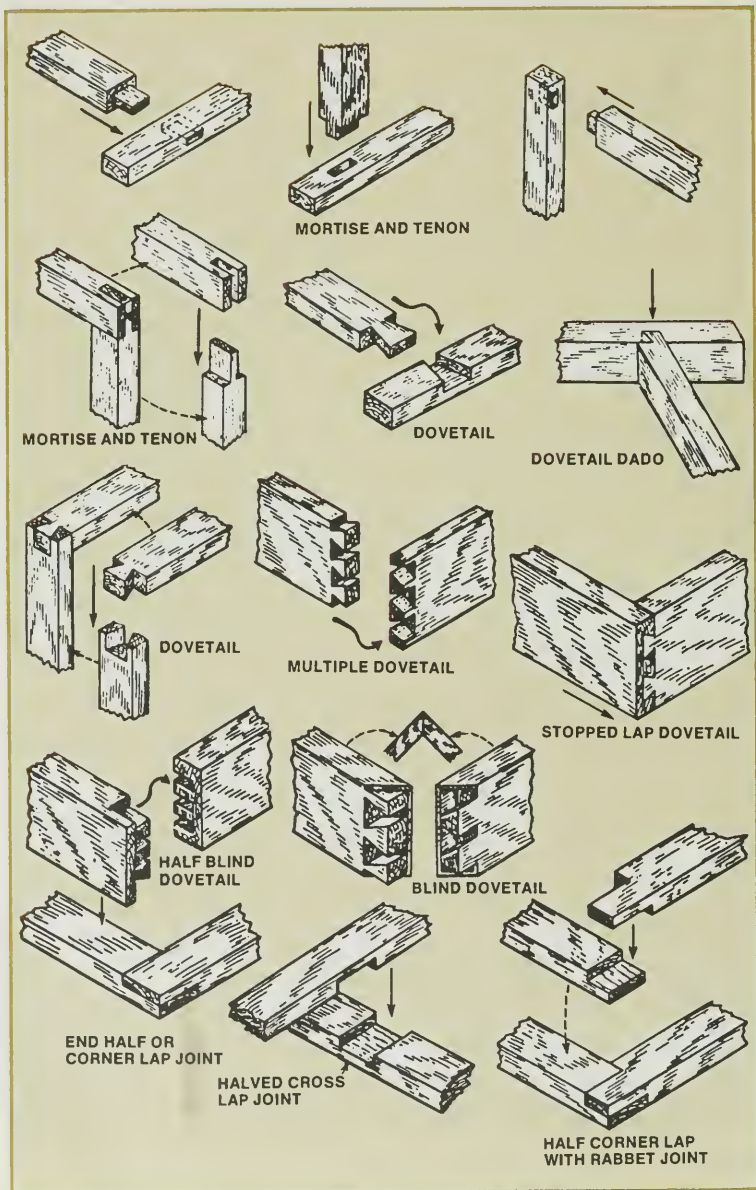
A stopped dado is laid out in the same manner as a plain dado, with the exception that it does not extend across the full width of the board.

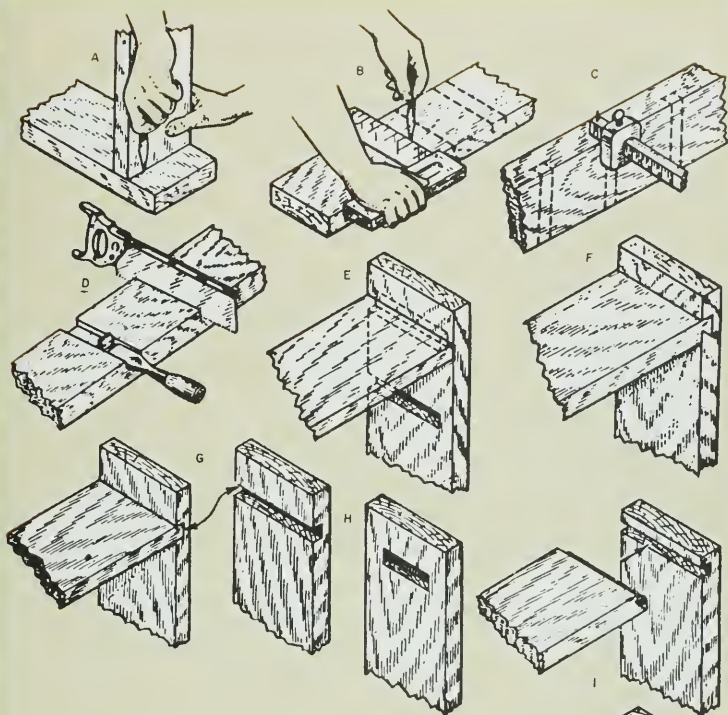
The dovetail, housed, and grooved types are three other variations of the dado joint.

A combined dado-and-rabbet joint is laid out and made in the same manner as a plain

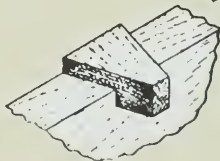
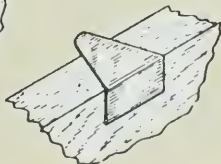
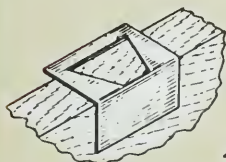
dado, except that a rabbet, or a recess, is cut on the end of the housed piece.

Mortise-and-tenon joints. The mortise-and-tenon joint is used extensively by skilled woodworkers. When properly laid out and accurately made, it is strong and dependable. To assure maximum strength and rigidity, it must be fitted very accurately. Mortise-and-tenon joints are used in the construction of desks, tables, chairs, and cabinet furniture that will be subject to hard usage. While there are several kinds of these joints, the directions given here are for the type known as the blind mortise-and-tenon joint. The description and draw-

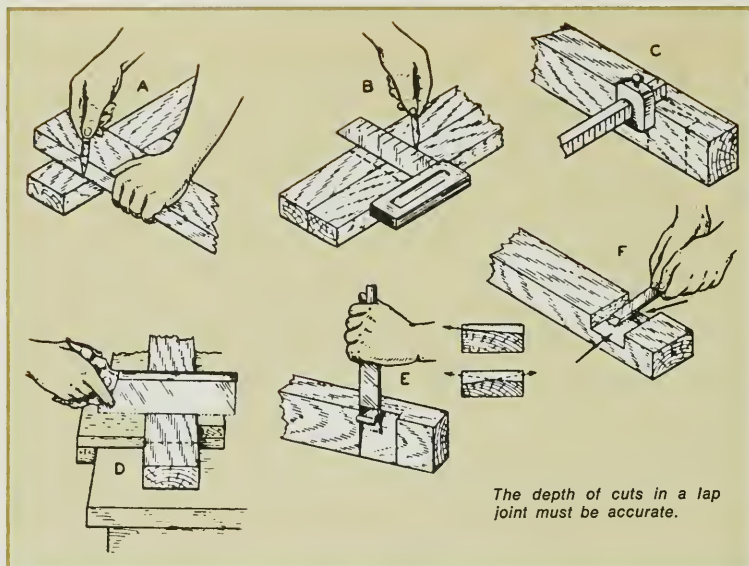




Dado joints take many forms. Drawing G is a housed dado, the simplest of dado joints. In selecting the type of dado to use, you must analyze the forces on the joint. The dado in G is fine for a bookshelf, but a dovetail dado as in F should be used where a pulling force tends to separate the joint.



TEMPLATES OR FORMS
ARE USED TO LAYOUT
DOVETAIL ANGLES



ings of the procedure in making this joint will help the woodworker to lay out and make any of the other types.

The tenon section should be made first. Cut and square both pieces of the work to the desired dimension and plainly mark both faces of each piece for easy identification. From the end of the piece in which the tenon is to be cut, measure back a distance equal to the length of the tenon, then square the shoulder line and mark it around this piece.

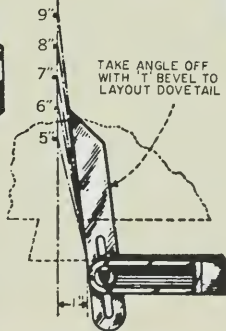
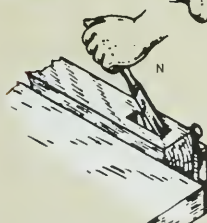
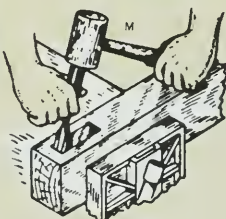
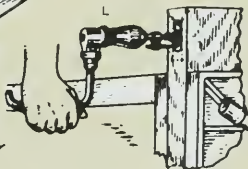
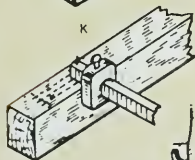
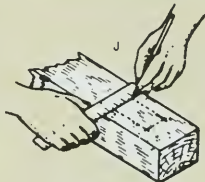
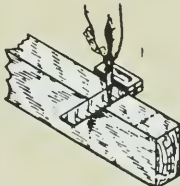
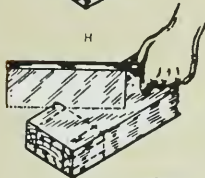
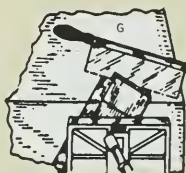
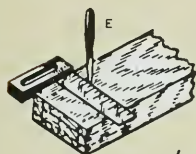
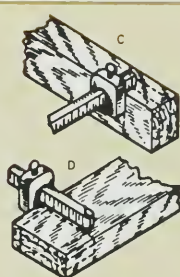
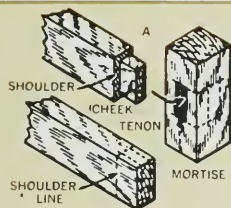
For general purposes, the tenon in this type of joint should be one-quarter to one-half as thick as the entire board. To lay out the thickness of the tenon correctly, locate the exact center of one edge, accurately measure with a rule one-half the thickness of the tenon each way from the center, and mark these places with the point of a knife-blade or a brad awl. Set a marking gauge to these points, and mark both lines across

the end and down both edges to the shoulder line previously marked around the board. All gauging must be done from the face side of the work.

The width of the tenon also must be laid out very carefully, and the lines gauged through these points across the end and down both sides to the shoulder line. With the try square as a guide and using the point of a sharp knife, score the shoulder line repeatedly, to a depth of about $\frac{1}{16}$ -inch.

Fasten the work securely in the vise, and using a very sharp chisel, cut a narrow triangular groove along the outside of the scored line on the waste material. Fasten the work at an angle in the vise, and with a backsaw proceed to cut the cheeks of the tenon to the shoulder line.

Change the position of the piece in the vise so the next cut will be made square with the face of the work. Now proceed to

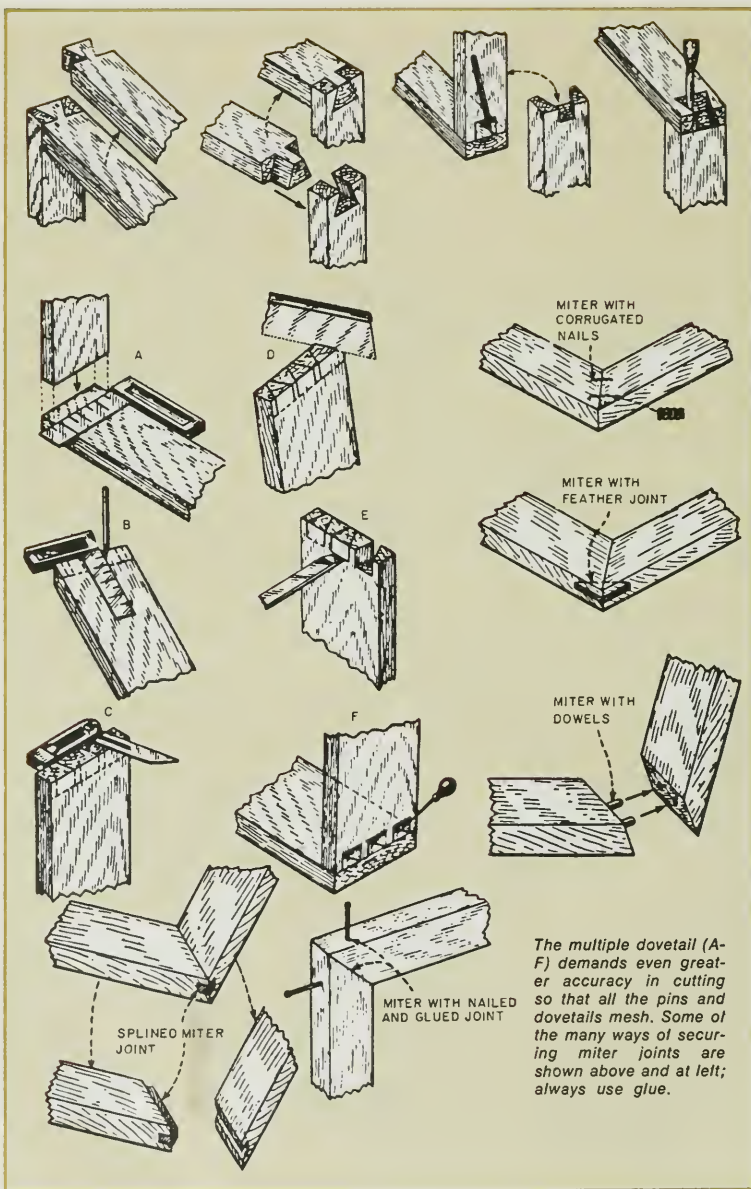


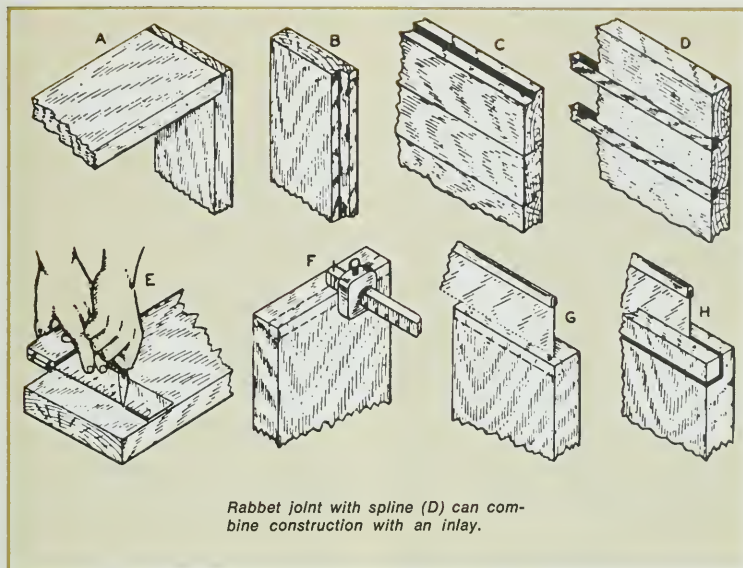
MAKE PINS ABOUT 1/4" THICK ON BACK OR SMALL END.



TAKE ANGLE OFF WITH 'T' BEVEL TO LAYOUT DOVE TAIL

The mortise-and-tenon (A-N) is as it appears—a very strong joint giving rigid support to a variety of furniture or wood projects that are subject to hard usage. Layout technique for making dovetails is shown at the left.





cut the shoulder of the tenon to the required dimension with the backsaw.

The length of the mortise must equal the width of the tenon. To determine the position of the mortise, square lines with the try square across the work. Locate the exact center of the piece, and measure each way from the center exactly one-half the thickness of the tenon to lay out the correct width of the mortise on the other board. Mark these points now, and carefully check the width of the mortise to make sure that it is equal to the thickness of the tenon. Gauging from the working face, mark through these points, stopping at the end of the mortise. A center line should also be gauged lengthwise of the mortise.

Secure the work firmly in a vise. Select an auger bit $\frac{1}{16}$ -inch smaller than the width of the mortise, and adjust the bit gauge to bore holes $\frac{1}{8}$ -inch deeper than the length of the tenon. Place the spur on the bit on

the center line, keeping the bit exactly perpendicular to the face of the work. Begin boring a series of overlapping holes, with the first hole just touching the end of the mortise and the last hole touching the opposite end.

With the work held securely in the vise, and using a small, sharp chisel, clean out the waste material by cutting out both sides of the mortise as the depth increases. Pare the walls of the mortise to the gauge line, keeping them perpendicular to the face of the work. The final step is to square the ends and remove waste material from the bottom by using a chisel a little narrower than the width of the mortise.

Dovetail joints. Dovetail joints are used by skilled woodworkers in the construction of fine furniture, drawers for tables or desks, and projects where good appearance and strength are desired. A dovetail joint has considerable strength, due to the flare

of the projections, called pins, on the ends of the boards, which fit exactly into similarly shaped dovetails. The spaces between the pins and between the dovetails are called sockets, or mortises. The pins are visible on the ends of the work, and the dovetails are visible on the face of the work.

The angle of the dovetail must not be made too acute; this would defeat the purpose of additional strength because an acute angle is weakened by the short grain at the corners of the angle.

The first step in determining the angle of the dovetail is to square a line from the edge of the board, measuring 5, 6, 7, 8, or 9 inches along the board from the edge. Measure from the line along the edge, and connect the points with a line. To mark the other angles make a template, that is, a pattern of cardboard or thin wood, of the angle selected, and use it as a guide.

While the strongest joints are those in which the pins and the dovetails are the same size, for the sake of appearance the dovetails are usually made larger than the pins, though not more than four times the width of the pins. The thickness of the pin and the width of the dovetails will vary in a great many instances, but it is considered good practice to make the pin or its corresponding socket about $\frac{1}{4}$ -inch on the narrow side.

The three most widely used types of dovetail joints are the half lap dovetail, the single dovetail, and the multiple dovetail. Dovetail joints are not easy to make, and the beginner is strongly advised to practice on waste material before attempting an actual project.

The single dovetail joint is the most commonly used.

To make it with two half tongues and a whole dovetail, first locate the shoulder lines of the joint by measuring the thickness of each piece of wood. Mark the position of the shoulder line and square the line. On one piece, lay out the tongue with a tem-

All about Joints and Joinery

plate and cut to required size. Saw the sides of this piece with the backsaw and then remove the waste material to the shoulder line with a chisel. Hold this piece on the other board to mark the shape of the dovetail. Cut out with saw and chisel.

A multiple dovetail joint is merely a series of single dovetails extending along the entire length of the end of the board.

Miter joints. Miter joints are used often in making picture frames and screens. They are merely butt joints with the angle at the corner halved between the two pieces that are to be joined. Miter joints are usually cut at an angle of 45° . While it is a simple matter to mark out an angle of 45° , miter joints are usually sawed in a miter box.

A miter box is an accurate tool for reproducing an angle of cut, from 30° to 90° , in pieces that are to be fitted together. The material is set in the miter box at the required angle and is cut with the backsaw. When a large number of miter joints are to be nailed or glued together, a special clamp or picture frame vise is used.

Dowels, tongues, or slip feathers are sometimes used instead of nails to strengthen the joint further. When tongued miter joints are made, each of the pieces is grooved, and a wooden tongue of required size is glued into the groove. This strengthens the miter joints, and also prevents the pieces joined in this way from warping.

Tongue-and-groove joints. It is impractical to make tongue-and-groove joints in the home workshop, as finished tongue-and-groove lumber, when specified, is supplied by the dealer. This type of joint is made by cutting a groove longitudinally with the grain of the wood on one side of a board and a tongue on the other side to fit the groove of an adjoining piece. The tongue-and-groove joint is used principally in flooring.

See also: CABINETS; CHISELS; DOWELS; DRAWERS; RADIAL ARM SAW; TABLE SAW; TOOLS; TOOL TECHNIQUES.

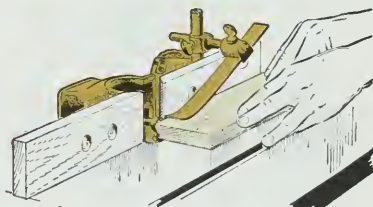
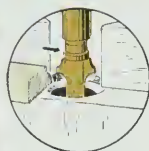
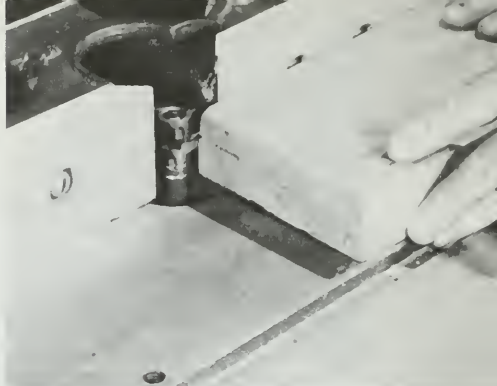
Machine Molding of Flat Stock

How to make and use jigs, patterns and forms to mold stock on a shaper, drill press or power saw

ORNAMMENTING TABLE EDGES and cabinet tops with moldings is often the touch that gives a professional air to a project. It is a must for many traditional designs. Difficult to make by hand, moldings are easy to shape with machines, requiring only a fraction of the time taken with hand work.

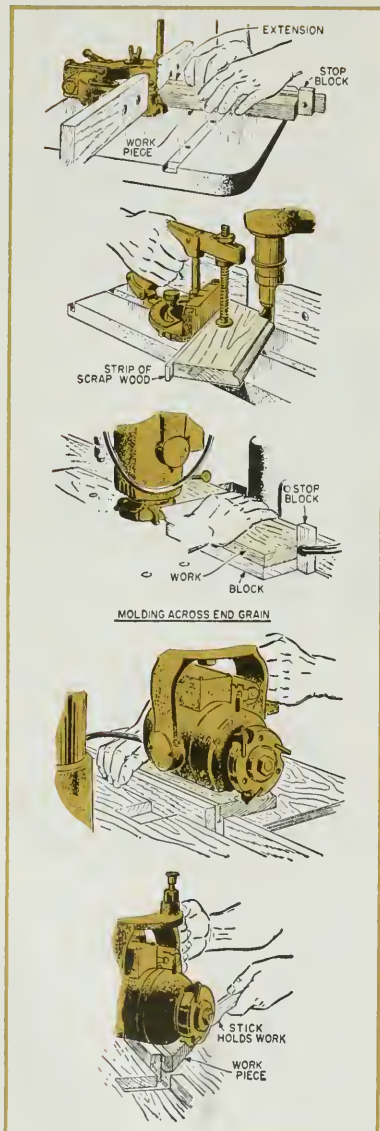
Various types of molding cutters are used in small shops. The large molding head with its interchangeable cutters is a useful accessory for circular saw, radial saw and combination machines because the diameter is large enough to bring the peripheral speed of the cutters near that of smaller molding cutters mounted on a shaper which rotates at a higher speed. The molding head should not be used on a small drill press. Three-wing cutters are obtainable in many patterns, and are designed to be used in cutting parts of two or more moldings. Many different patterns are possible with three different styles. A variation in the height-setting of the spindle with relation to the thickness of the piece being shaped, or a change in the depth of cut into the edge of the work, changes the profile of the cut.

Molding operations on straight work fol-



MOLDING AN EDGE WITH 3-WING CUTTERS

low the methods of jointing and rabbeting. Where only part of the edge is cut away the fence sections are set in alignment with enough of the cutter projecting in front of the fence to make the necessary depth of cut. If the cutter is mounted to cut on the underside of the work, which is the safest procedure, the solid upper edge of the piece slides against the fence assuring a uniform depth of cut. Use hold-downs where pos-

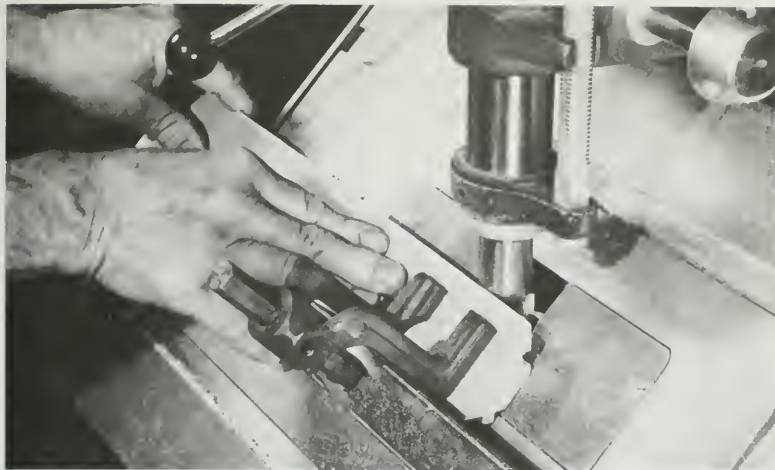


sible, especially on narrow work, and feed uniformly against rotation. Never attempt to mold narrow and springy pieces without jigs or other holding devices. If you are shaping with a drill press it may be necessary to cut the mold on the upper side of the work, because of the fixed direction of drill press rotation. Be sure to keep the piece on the table continually, because the slightest lifting will cause the cutter to gouge into the work. When making molding cuts requiring removal of considerable material, take two or three passes with a fine cut on the last pass to give smoothness.

A setup for molding an edge with a radial saw using a molding head is shown in a drawing. The standard fence is replaced with two pieces of wood separated at the center to clear the cutters. A sheet of plywood on the table elevates the piece high enough to permit the cut to be made on the underside of work piece. Height adjustment of the head is made by raising or lowering the track arm. Be sure all arm and motor adjustments are locked. This setup guards the cutters effectively.

When taking a molding cut across the end grain of a work piece the fence not only forms a guard but serves as an end-gauge as well. Hold the work against a miter gauge extension, to which is screwed or clamped a stop block to keep the cutter from knocking the work away. As there is a little tendency for the blades, especially if dull, to tear the end grain, take one or two roughing cuts followed by a light finishing cut. If the end of the work is out at an angle, swivel the miter-gauge head to suit. When "returning" a molding cut around the end grain first or at least leave the trailing edge to be molded last to trim away splinters. An extension or strip of scrap wood behind the piece helps prevent splintering. A stop block is not required when a gauge clamp is employed.

To take a molding cut across the end grain and underside of a piece of work with

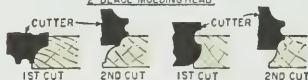
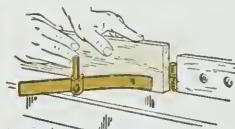
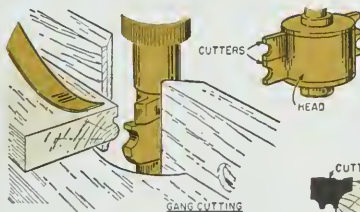
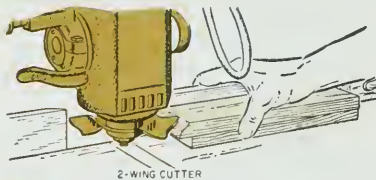
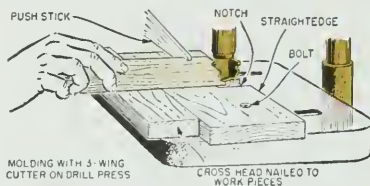


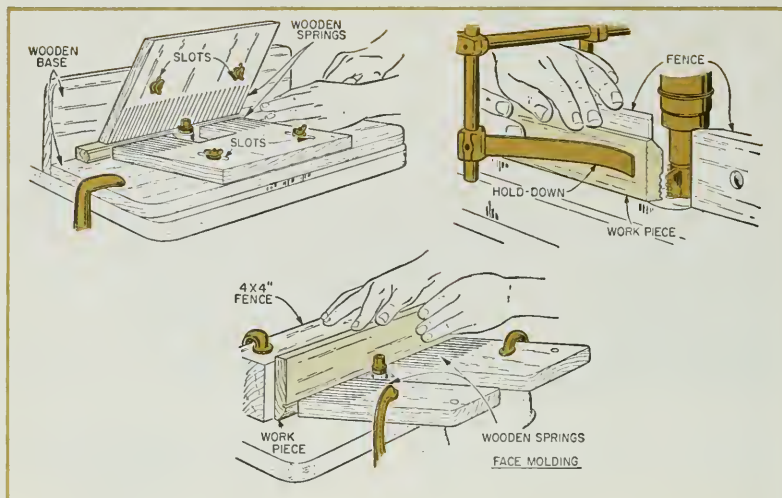
the radial saw, block up the work, clamp a stop block to the fence or table, and advance the motor, feeding forward. With certain cutters the molding cut would have to be made on the top side of the work, in which case the work would not need shimming up from the table.

For some molding cuts the machine may be set up horizontally, as for crosscutting with a saw. The depth of mold is limited in this position by the projection of the blades and the motor clearance above the work piece. The machine head could also be turned 90° and the work fed along the fence. For angle cuts, swing the machine arm to the angle of the mitered end of work piece.

If the entire edge is molded, it is cut back unless the fence is set very accurately. A little cutback is insurance that projecting

▲ *Plowing a groove along a miter with a molding cutter mounted on a drill press. Note how table is tilted to accommodate miter.*





beads will be fully rounded. In this case set the out-feed section of the fence forward to support the molded part, exactly as when jointing. In end molding, the stop block or miter gauge clamp regulates the end position and the depth of cut, whether a partial or complete mold is being made. With a drill press, a miter gauge can be simulated by clamping down a straightedge notched to clear the cutter, and nailing a crosshead under the piece to slide against the straightedge, guiding the work. Use a push-stick when nearing the end of the cut to steady the work piece.

Molding cuts are also made by ganging cutters, either with individual units or by the assembly of pairs of blades in a molding head. More often parts of cutters are used singly, one cut after another being made on the piece, with adjustments of fence and spindle height to place the cut where wanted. When assembling a molding profile in this way, take pains to match the cuts accurately. Trial runs in scrap are advisable to prevent mistakes.

Face molds are made in the same way as edge molds, but with the face of a piece against the fence, instead of the edge. Here the hold-down presses the piece against the fence as beads are being cut.

You can also clamp a piece of 4 x 4-inch stock to the shaper table for a fence and run the back of the work piece against it, while the cutter shapes the face. The advantage of this method is that all pieces are made the same thickness, and when run around a cabinet the corner miters will "member" without any manipulation of the faces. Since the slightest movement of the work away from the fence would result in gouging, strong pressure with wooden springs is necessary.

The general practice in making narrow strip moldings is to mold the edge of a board and then rip off the strip. However, economy of time spent in changing machine setup can be practiced by first ripping strips to size and then setting up for molding cuts. Use a jig designed for this job, as shown in a drawing with wooden springs holding the

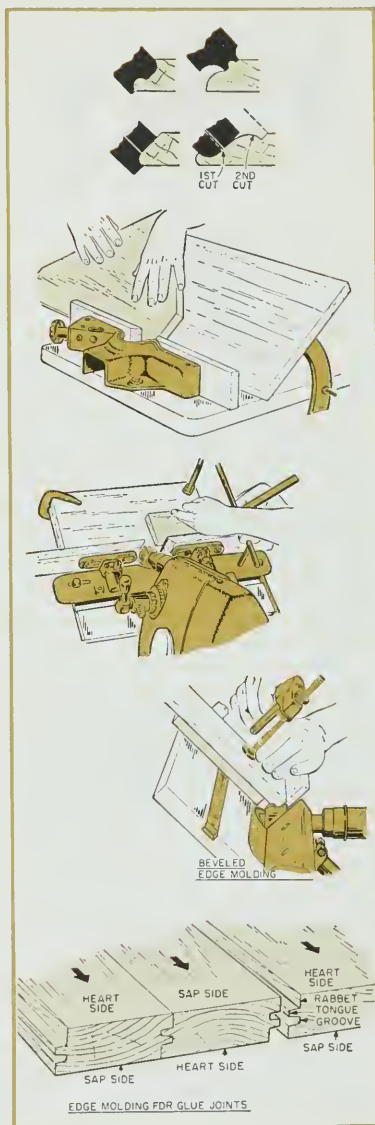
Machine Molding of Flat Stock

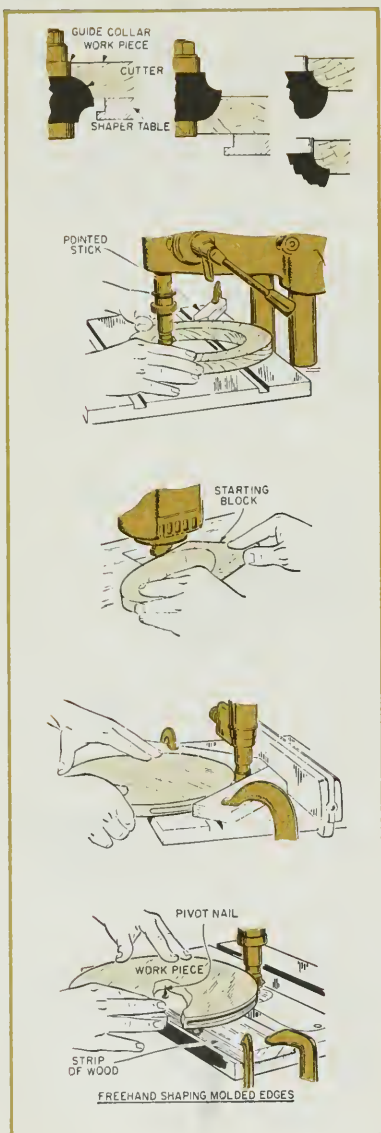
strip both down and against the fence. Dimensions are variable. The wooden base, which is clamped to the table of the shaper or other machine, supports wooden springs in horizontal and vertical positions. These, secured by bolts passing through slots, are adjustable within the necessary range. To use, clamp the base to the machine where the strip, passing between the fence and the cutter, will receive the full molding. Press the springs against the strip and lock. Then feed against rotation from one end and pull out from the other. It works as well for face-molding, for jointing, rabbeting, and grooving.

The shape of the cut made by a standard molding cutter can be changed by making the cut on a mitered or beveled edge. Not all cutters are suitable for this use however. For shaper or drill press use a tilting table; for a combination machine, tilt the table, using it upright, or horizontally. With a radial saw it is simply a matter of tilting the motor and molding in the usual way. End-molding on a combination machine is accomplished by tilting the table.

Strong and self-aligning glue joints are made in a combination jointing and grooving operation in which a rabbet, a tongue, and a groove are cut in one pass. For invisible joints, first rip or joint the edges straight. Arrange the boards in order with heart and sap-sides alternating, but with the grain of each running in the same direction as much as possible. Mark across the edges to identify them in joining and run the opposite edges from opposite sides. Such shaping doubles the gluing area, introduces over $\frac{3}{4}$ -inch of horizontally glued surface to resist shear, and compels the edges to conform to each other upon assembly. Adjust the height of the cutter to center the profile on the thickness of the boards, making rabbets of equal depth on both sides.

Freehand shaping has its own technique. Working with the piece alone, the molding cannot cover all the edge, as about $\frac{1}{4}$ -inch





must be left to slide against a guide collar. Any irregularity in the edge is transmitted to the molding. If the cut is made on the underside, the guiding collar above is used. If the cut is made on top, the collar below is used. The size of the collar determines the depth of cut, and can allow for an offset or fillet, or eliminate it.

Remove the fence and mount the cutter with its collars. Both faces of the piece can be worked, if a flat band on the work piece near the center of the edge is left for a guide collar between the cutters. Insert a guide pin in a hole on the feed side of the machine, press the edge of the piece against the pin, and feed toward the cutter at a place where the cut will be with the grain. When contact is made and full depth is reached, swing the work away from the pin and slide it against the guide collar. Keep the pressure as light as reasonable to minimize scoring or scorching. Obviously, the collar can enter no curve smaller than itself. If the inside of a rectangular frame is shaped, skipping of the corners must be carved out by hand.

On a drill press or a radial saw, where no provision is made for a starting pin, a pointed stick clamped where it is convenient for swinging the inner edge of the work against the cutter can be substituted.

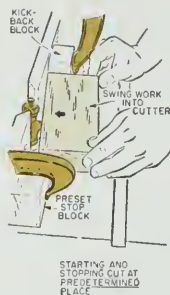
In certain work a fitted starting block is used. The molding is previously cut on the starting edge. Fit the block against the work, feed the starting block mold into the cutter, and move the two together as one piece. Once the work is well started, push the starting block aside. Smoothed discs can be molded by rotating them in a vee-form, which is cut out of a board and notched to house the cutter, for clamping to the table. Or you can set up a rip fence and clamp strips down, vee-fashion. To make a pivot jig, drive a nail through a strip of wood and force the nail into the center of the work piece on the underside. Clamp the strip to the table with two clamps and tap the strip

Machine Molding of Flat Stock

to feed the disc into the cutter. When full depth is reached, screw up the clamps tightly, and rotate the disc against the motion of the cutter. With this jig a roughly-sawed disc is molded to dimension and a true circle directly.

Full shaping of an irregular piece is done with patterns. In small units the pattern is a single piece of wood, usually of 1-inch stock. For production work it should be made of hardwood, or soft wood faced on the edges with strip fiber glued on. However, soft wood is durable enough for a short run. Make the pattern edges smooth and to the exact dimensions of the piece to be made, because the exact shape will be duplicated. It can be fitted with handles for keeping the fingers entirely away from the cutters. Attach to work piece with brads driven into pattern having flattened heads lying in the grain direction of the work piece. Rough-saw the work piece oversize and tap the pattern onto it with a hammer. Since the guide collar runs against the pattern, the full edge of the work can be molded. The pattern lies above the work and helps to guard the cutter.

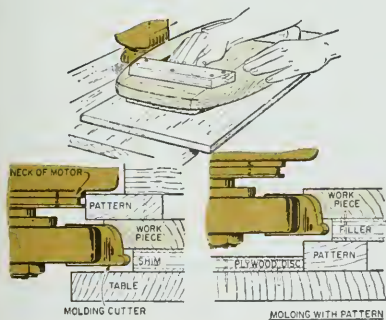
For large patterns, use several pieces of wood cleating them together. If used on a radial saw with a molding head, the neck of the motor can be used as a collar. Since the diameter at the neck of the motor is less than that of the molding head assembly, the

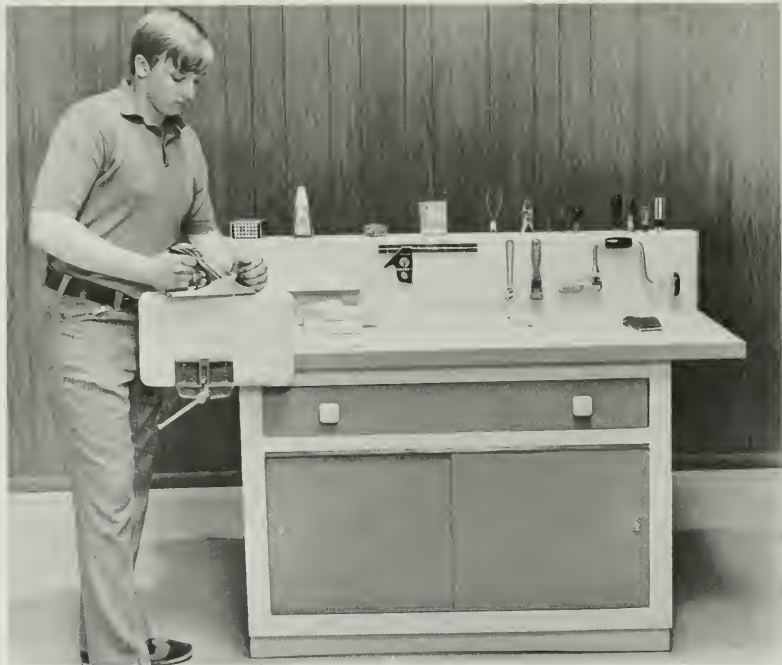


pattern must be made correspondingly oversize. This stationary guide scores little and will not burn the edge. A plywood shim lifts the work enough above the table to permit shaping underneath, and cutter guarding is almost perfect. The pattern can also be placed underneath. Here a filler between the pattern proper and the work lifts the piece for shaping the underside, or the entire edge. A plywood disc, accurately centered on the arbor and nailed to the table, guides the cutting. It is made of a size to bring the pattern to the same size as the work. The disc is stationary and neither scores nor burns the pattern. Ballbearing collars are available for use as guides. Since the outer race of a ballbearing is stationary when inner race rotates, it will not score nor burn but roll along the edge of the work or pattern, according to the nature of the shaping.

As in recessing, rabbeting, or grooving, molding cuts can be started at a given distance from the forward end, by swinging the work into the cutter using a kick-back block clamped to fence as a pivot. The cut may be stopped at a predetermined point marked on the fence with a pencil, or until the forward end of the work strikes a preset stop block.

See also: CABINETS; DOWELS; DRAWERS; DRILL PRESS; INLAY WOODWORKING; JIGS; LATHE; RADIAL ARM SAW; ROUTER; TABLE SAW; TOOLS; TOOL TECHNIQUES.





▲ No fancy cabinet work is required to build this sturdy workbench.

Build Your Own Workbench

You don't need a workshop full of equipment to build this sturdy, serviceable bench; just a few ordinary tools will do the job

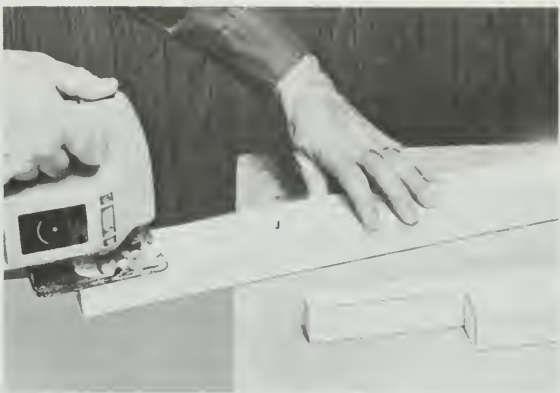
THIS STURDY WORKBENCH is easy to build with common tools. It has a backboard to hold frequently used equipment, a roomy drawer that slides on guides that you can purchase in any hardware store—no fancy cabinet work required—and a big double-door storage compartment in its base.

Begin by cutting out the main bench

frame members of 2 x 3-inch fir stock. Cut the notches, as shown in the drawings, with a saber saw. If you haven't got one, don't worry; you can do the job almost as easily with a handsaw.

Laminate the four crosspieces with nails and white glue, as shown in the photograph. The inner half of each crosspiece is two inches shorter than the outer half. Center the shorter pieces on the longer one to form a 1-inch notch at each end. The notches are to accommodate the upright legs of the frame.

Assemble the frame, using the drawings as a guide. Coat all mating surfaces with white glue and toenail the laminated cross-



➤ Cutting the frame members with a saber saw. This job can be done almost as easily with a handsaw, but be careful to keep the cuts square.



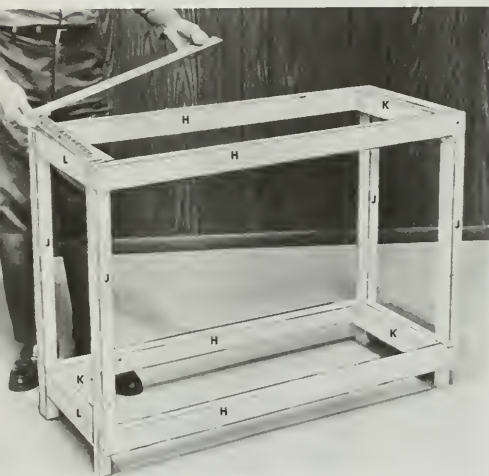
➤ Laminating the cross-pieces with nails and white glue. The use of a long piece and a short piece forms a notch at each end. The notches accommodate the up-rights of the frame.



➤ To nail a cross-piece to a leg. The frame, if completed in this position, would be on its back or on its front.

3176

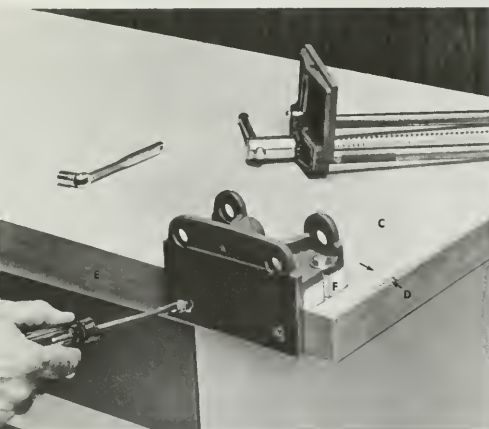
▼ *Checking squareness. Do this after the frame is assembled but before the glue dries. Tack diagonal braces of scrap wood to the frame to hold it square until the glue sets.*



Build Your Own Workbench



▲ *Installing a side panel. Glue and nail the compartment bottom in place first, then the side and back panels.*



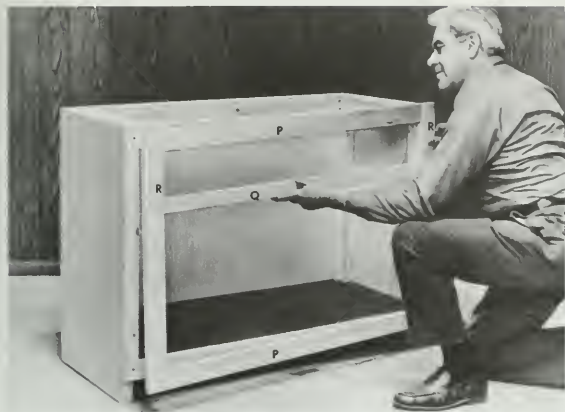
▲ *Screwing the vise to the completed bench top. The top is upside down in this photo. The spacer block between the vise and the surface of the top is to bring the top edge of the vise flush with the top edge of the table.*

▼ *Placing a glue dowel in a side member of the front frame. Drilling the dowel holes accurately is probably the trickiest part of building the workbench. Use a dowel jig, unless your eye is as accurate as a carpenter's square.*



Build Your Own Workbench

3177



◀ Checking the fit of the front frame. Attach it to the main frame with glue and finishing nails.

▼ Screwing the drawer slide in place. The slide mates with guide installed in the bench.

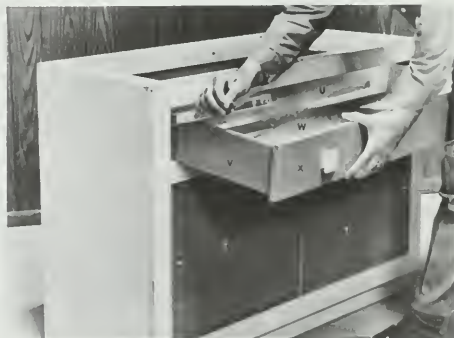
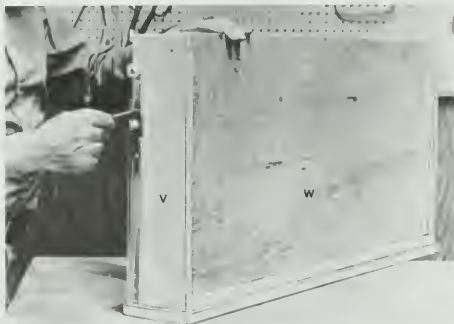
pieces to the legs. The end grain of the crosspiece is very absorbent. Give it a primer coat of white glue and let it dry. Give it a second coat when you assemble the frame.

Check the assembled frame for squareness and tack-nail some diagonal braces of scrap stock to it to hold it square until the glue sets.

Cut the side panels and compartment bottom of $\frac{1}{4}$ -inch plywood to the dimensions shown in the drawings. Cut the back panel of $\frac{3}{4}$ -inch plywood. Use glue and finishing nails to install them. Do the compartment bottom first, then the side and back panels.

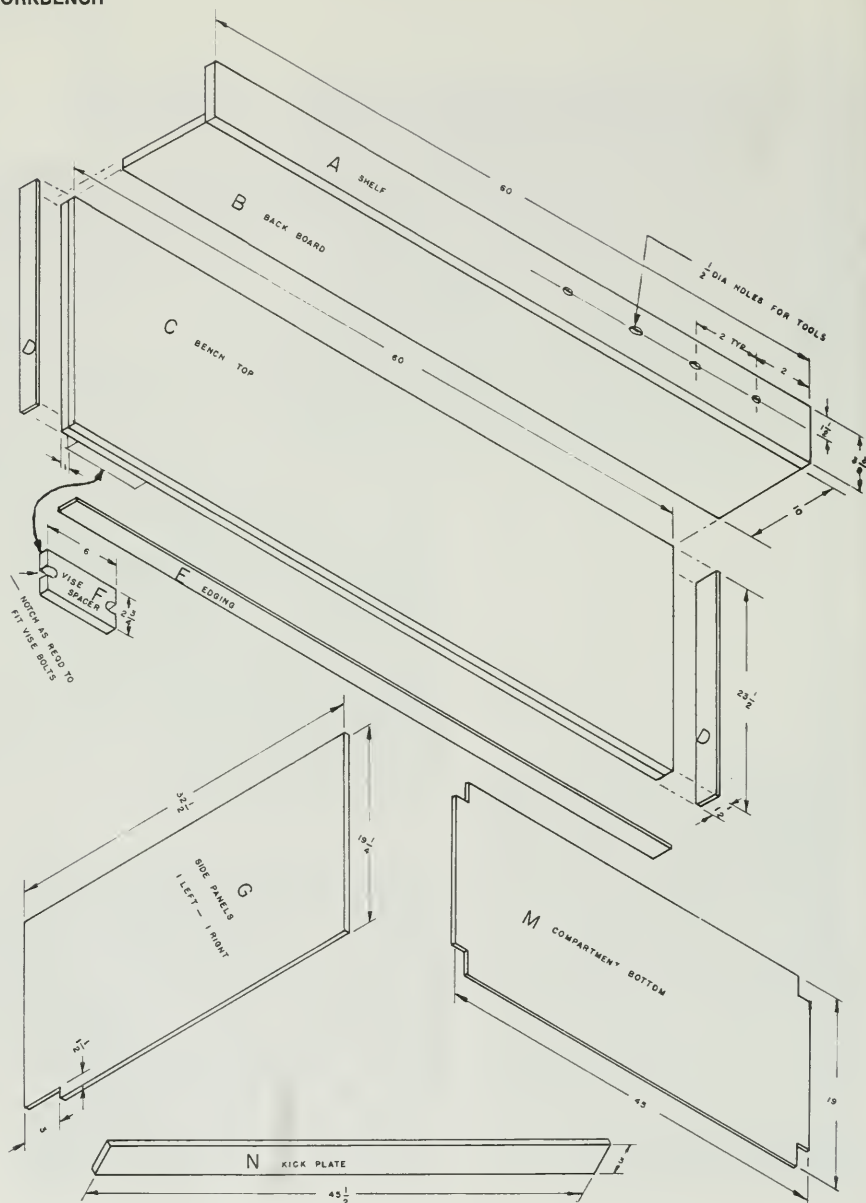
The top of the workbench is made of two pieces of $\frac{3}{4}$ -inch plywood glued together. The front edge and two side edges are trimmed with $\frac{3}{8} \times 1\frac{1}{2}$ -inch doorstop stock. Attach the doorstop with glue and nails.

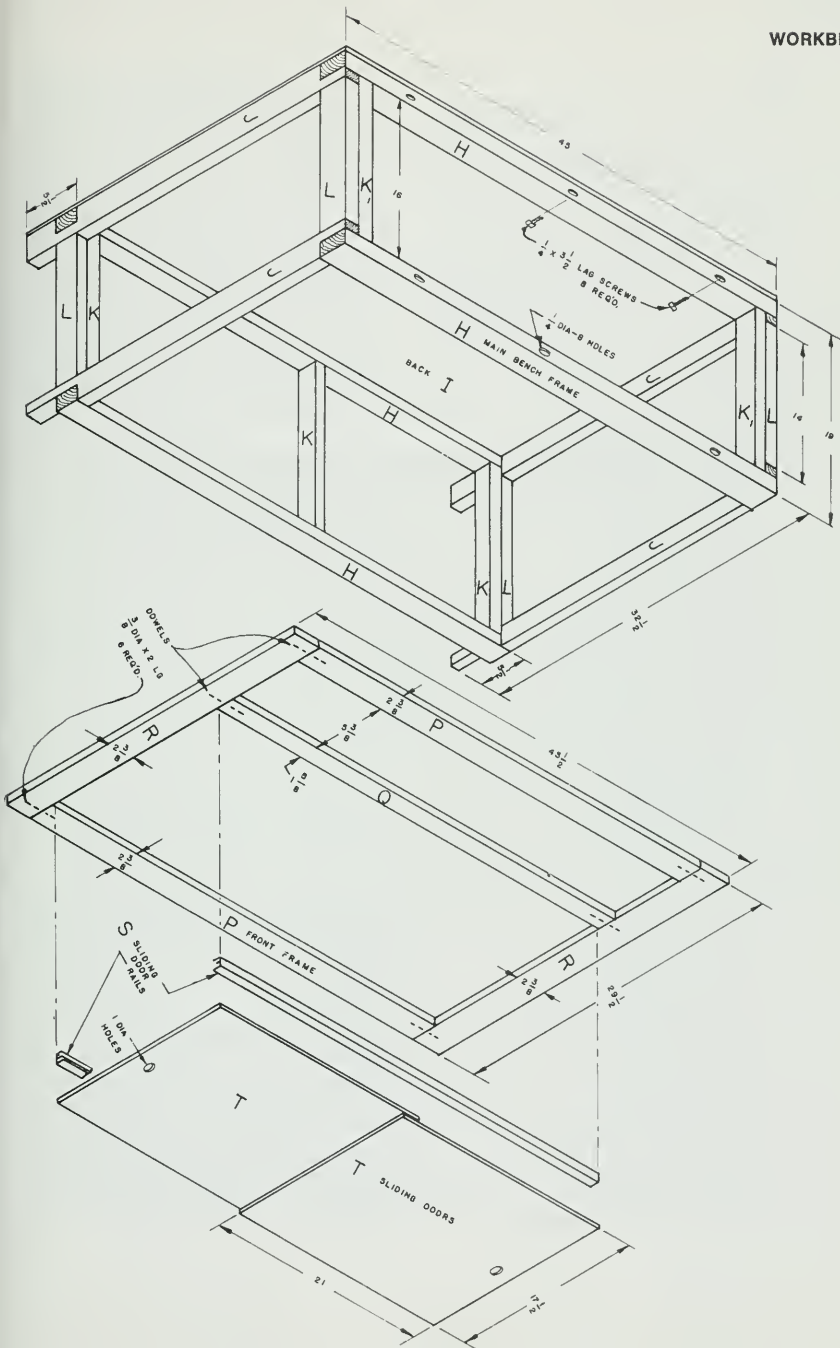
Turn the top upside down to install the vise. The exact installation depends on the vise you order, so consult your supplier about the size and location of the lag screws

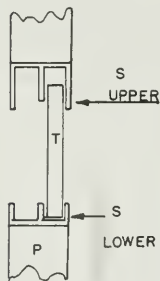
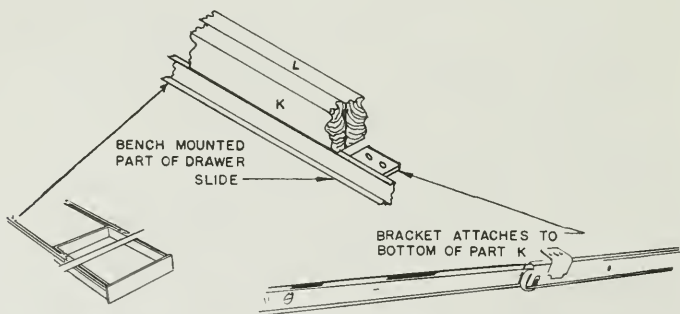
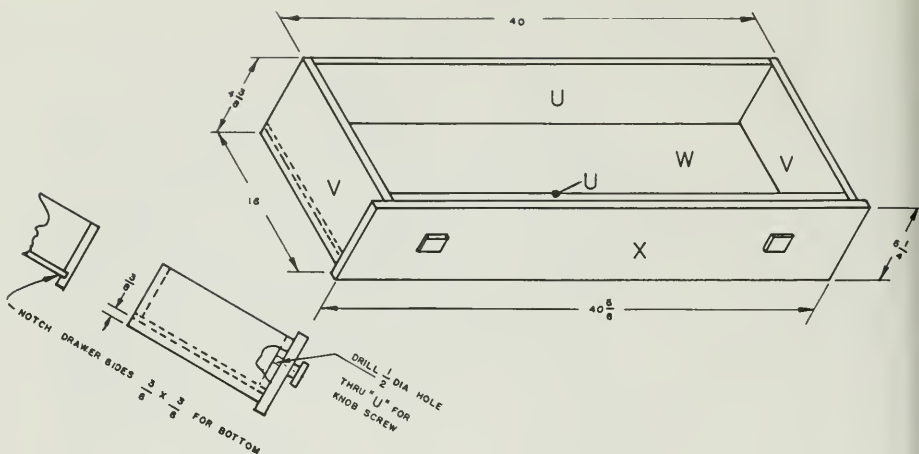


➤ Installing the drawer in the bench. Remove the front mounting screws on the drawer slides. Tip the slides up to engage the nylon bearings, then replace the front mounting screws.

WORKBENCH







SECTION OF SLIDING DOORS

to be used. The vise spacer block should be 1 inch from the side edge of the bench top. Shape the spacer block to accommodate the vise screws.

The purpose of the front frame is to give the bench a finished professional look. Cut the pieces carefully of pine to make sure they are accurate and use a doweling jig to drill the dowel holes. Give the frame a trial fit before gluing it. If you are satisfied, glue and clamp it together. When the glue sets, attach it to the main frame with glue and nails. Also nail and glue the kickplate to the frame.

Build Your Own Workbench

3181

Assemble the drawers as shown in the drawings, gluing and nailing all joints. The drawer slides come with instructions, so don't be concerned if the ones you purchase differ somewhat from the ones shown here. Cut the silding doors of 1/4-inch plywood. They simply lift and drop into place in the aluminum channels. When you nail the channels in place, be sure to use the channel with the deeper set of grooves at the top.

Drill the two long upper frame members with three 1/4-inch holes each to receive the lag screws and screw the top on the bench. Drive the screws from the bottom of the

frame members into the bottom of the workbench top.

Assemble the backboard and shelf and attach it to the bench top with glue and nails. The plans show a typical arrangement of 1/2-inch tool holes on the shelf, but this can be altered to suit your needs. You can delay drilling the holes until you have used the bench for a while. If you find yourself consistently placing a tool on the shelf, drill a hole for it.

Original design by Steve Ellingson.

See also: DOWELS; HAND TOOLS; LUMBER; NAILS; SABER SAW; SAW; TOOL CADDY; TOOL CHEST; TOOLS.

MATERIALS LIST

Quantity	Size and Description	Purpose
1	3/4" 3 3/8"x60" plywood	shelf (A)
1	3/4" 10"x60" plywood	back board (B)
2	3/4" 23 1/2"x60" plywood	bench top (C)
1	3/4" 2 1/4"x6" plywood	vise spacer (F)
1	3/4" 3"x45 1/2" plywood	kick plate (N)
2	1/4" 19 1/4"x32 1/2" plywood	side panel (G)
1	1/4" 32 1/2"x45" plywood	back (I)
1	1/4" 19"x45" plywood	bottom (M)
2	1/4" 17 1/2"x21" plywood	door (T)
4	2" 3"x45" fir	bench frame (H)
4	2" 3"x32 1/2" fir	bench frame (J)
5	2" 3"x16" fir	bench frame (K)
4	2" 3"x14" fir	bench frame (L)
2	3/4" 2 3/8"x40 3/4" pine	front frame (P)
1	3/4" 1 5/8"x40 3/4" pine	front frame (Q)
2	3/4" 2 3/8"x29 1/2" pine	front frame (R)
2	3/4" 3 3/8"x38 1/2" pine	drawer back and front (U)
2	3/4" 4 3/8"x18" pine	drawer sides (V)
1	3/4" 5 1/4"x40 5/8" pine	drawer front (X)
1	3/8" 18"x39 1/4" pine	drawer bottom (W)
2	3/8" 1 1/2"x23 1/2" door stop	side edging (D)
1	3/8" 1 1/2"x60 3/4" door stop	front edging (E)
2	40 3/4" aluminum for 1/4" door (Reynolds aluminum #3621 or equivalent.)	door rails (S)

NOTE: Also need wood dowels, lag screws, knobs, glue, box nails, finishing nails, brads, drawer guides, finishing materials and vise.

Make a Modern Multi-purpose Workbench

This carefully designed bench packs a lot of versatility into a small space

NEAT ENOUGH to be classed as a piece of furniture, this workbench occupies a minimum of floor area, yet has more than 11 cubic feet of space for storing all the hand tools you'll need, including small portable electric tools and appliances such as a drill, sander, glue pot and soldering iron. It includes such features as a generous-sized linoleum-covered working surface with a shaving trough which can be covered to provide a flat-topped surface; a compartment for sandpaper and sanding blocks; five roomy drawers; tool cabinets; file and screwdriver racks; shelves; magazine holder; built-in electrical outlets complete with pilot light; overhead adjustable lamp; a supporting device for holding long work and a 20 x 22-inch high drawing board. A standard 24-inch high stool, available at most hardware stores, will team up well with the knee-hole to enable you to work on small jobs in comfort.

The workbench is made up of seven separate units, so you can build the complete project at one time, or just construct the basic bench and add one or more of the other units later on. Use a good grade of pine throughout. Application of linoleum to the bench top is optional, but it provides an



▲ Occupying no more floor space than an ordinary desk, this workbench has a place for all your small tools and the equipment you need for hobby crafting as well as for making home repairs or furniture building.

ideal work surface, is easy on sharp-edged tools, will give many years of wear and is easily replaced.

The basic bench. Cut legs and rails to size, then make joining notches and rail tenons on a circular saw. Make the through-mortises in the legs for the rail tenons, then bore the holes in the rails, legs and stretchers for the lag screws and carriage bolts. Glue is not necessary in the assembly of the legs, rails and stretchers, as tight joints can be had with the lag screws and bolts alone. However, when constructing the six units following, use glue and cross-nail wherever possible, such as for the end-dadoed joints used in the drawers, combination shelves and tool cabinet.

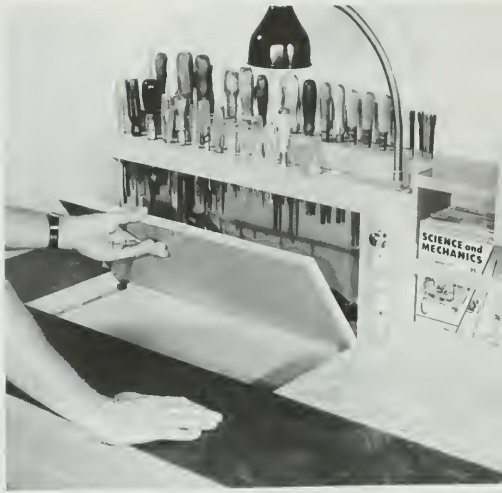
Each bolt hole for fastening the top pieces to the bench should be bored in one pass. Clamp each top piece in place and

Make a Modern Multi-purpose Workbench

3183



▲ The magazine holder provides an ideal location for mounting an electric drill when used to operate a flexible shaft. Note convenience of the lamp to concentrate the illumination on the work.



▲ The file and screwdriver cabinet lid can be let down to cover the shaving trough when you need a uniformly flat surface over the entire bench top. It requires no hinges in its raising or lowering action.

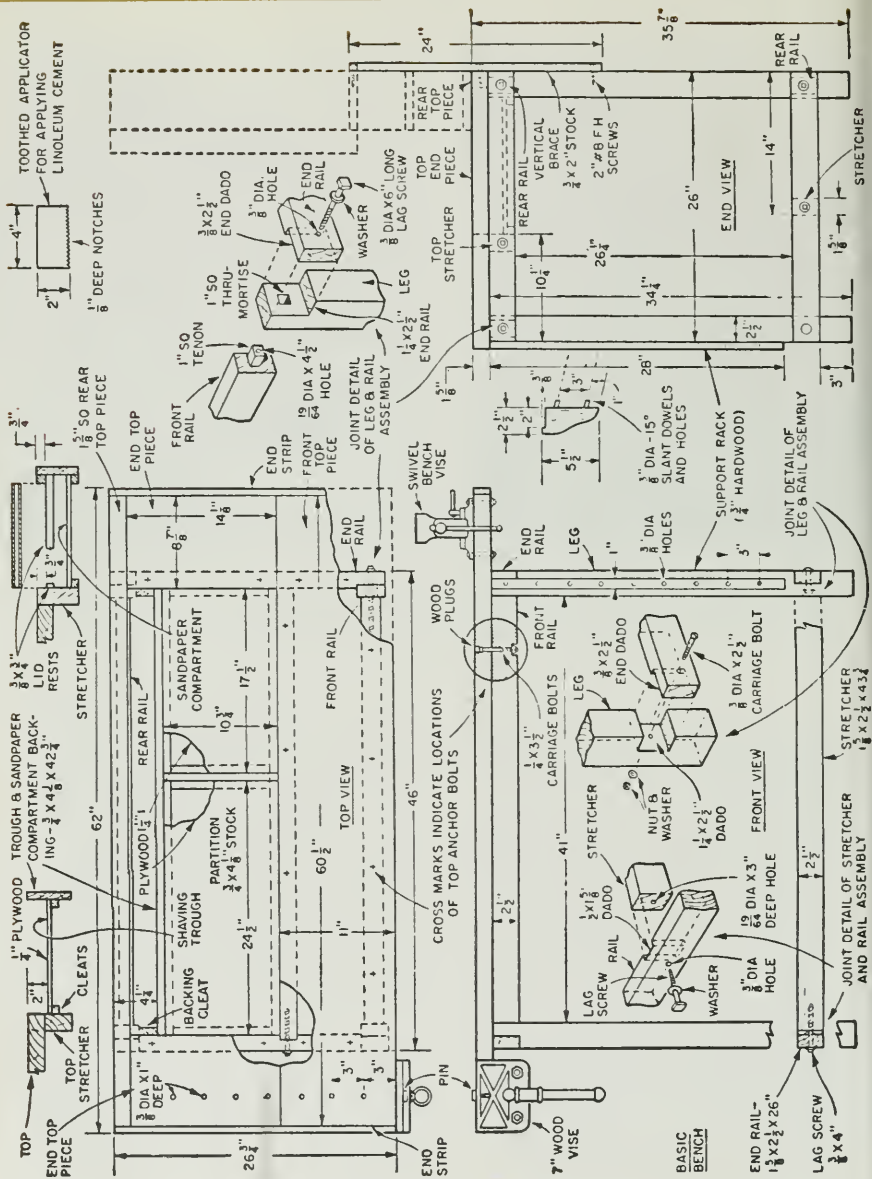
bore through it into the bench rail or stretcher wherever a bolt is to go. This will guarantee that the holes for each holding bolt are perfectly aligned.

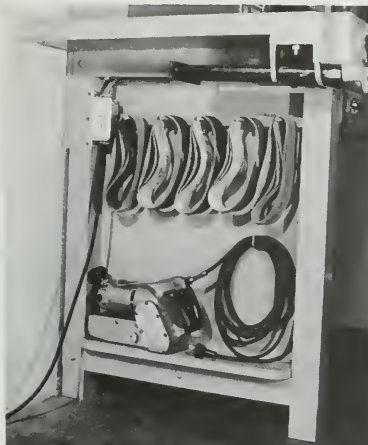
Recess bolt heads and nuts and cover the heads with wood plugs. After nailing the rear top piece and the end strips, add the trough backing and partition. Next, install the support rack. Do not finish top of bench until you have built and installed the four-drawer unit and the knee-hole drawer unit.

The four-drawer unit. Cut four horizontal and four vertical framepieces and join with corrugated fasteners to form two frames to which 1/4-inch plywood sides are nailed. Join these side frame units with four crosspieces to form the framework for the drawers. Add the guide support, notched facings and drawer bearers.

Because the drawers have many dupli-

cate pieces, cut all of the front, side and bottom pieces at one time. Note that the bottom drawer is deeper than the other three. Now set up your circular saw and cut $3/8 \times 3/8$ -inch rabbets along the top and bottom edges of the drawer fronts. Then reset the saw and cut $3/8 \times 1 1/8$ -inch rabbets on the ends and round off the fronts on all four sides to form a lipped edge. Then arrange the dado cutters to make a $1/4 \times 3/8$ -inch deep groove and saw the sides, front and back pieces for the 1/4-inch plywood bottoms. Assemble the drawer pieces with glue and nails. Fit and align the runners and guides in the framework for each drawer individually. When completed, position the drawer unit at the right side of the bench with its face flush with the front top rail. Nail the framework to the legs, stretchers and rails. Then add the plywood back.





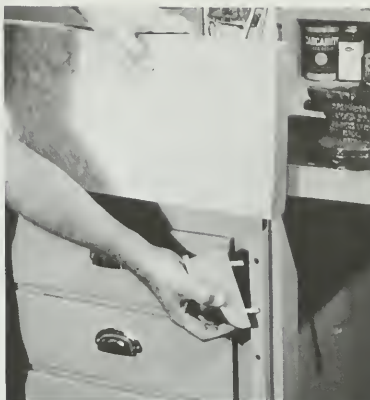
▲ Side piece of the kneehole cabinet serves as a compartment backing for an electric sander and an assortment of sanding belts. The corresponding area on the opposite side of the bench can be used for small tools, or shelves can be installed to hold small jars of nails, screws, etc.

➤ Hand tools may be hung on each side of the tool cabinet, and inside the door. The back of the cabinet can be used to hold the bulkier tools such as planes.



The kneehole drawer unit. Make this section up separately as you did the four-drawer unit and install under the top rails and stretcher. Fasten to the bench by nailing to the four-drawer unit and the left side bench legs. If you pull out the drawer about 15 inches, it will support a drawing board.

Finishing top of bench. At this point you



▲ Used in conjunction with the wood vise, this device supports the free end of long work.

can install the bottoms of the shaving trough and the sandpaper compartment. If you intend to apply linoleum to the bench top, raise the rests a distance equal to the thickness of the linoleum, so lids will be flush with bench top surface. When applying the linoleum, allow it to extend slightly beyond the edges of the bench top. When the adhe-

MATERIALS LIST—Basic Bench

Quantity	Size and Description	Purpose
4	2½" 2½"x34½" pine	legs
4	1½" 2½"x26" pine	end rails
3	1½" 2½"x43" pine	front and rear rails
2	1½" 2½"x43½" pine	stretchers
1	1½" 11"x60½" pine	top front
2	1½" 8½"x14½" pine	top ends
1	1½" 1½"x60½" pine	top rear piece
2	¾" 1½"x26¾" pine	top end strips
1	¾" 4½"x42¾" pine	trough backing
2	¾" 1½"x4½" pine	trough backing cleats
1	¾" 4½"x10¾" pine	trough partition
2	¾" ¾"x24½" pine	trough bottom cleats
2	¾" ¾"x17½" pine	trough bottom cleats
4	¾" ¾"x9½" pine	trough bottom cleats
1	¾" ¾"x17½" pine	trough lid cleat
2	¾" ¾"x10¾" pine	trough lid cleats
1	¾" 2½"x5½" hardwood	support
1	¾" 1"x28" hardwood	support rack
1	¾" 10¾"x17½" plywood	trough lid
1	¼" 10¾"x24½" plywood	trough bottom
1	¼" 10¾"x17½" plywood	trough bottom
2	¾" diameter x 2" support dowels	
16	¼"x3½" carriage bolts, nuts and washers	
2	¾"x2½" carriage bolts, nuts and washers	
6	¾"x6" lag screws with washers	
4	¾"x4" lag screws with washers	
16	¾" diameter x ½" hardwood plugs	
1	18"x72" linoleum	table top

NOTE: Also need linoleum adhesive and applicator.

sive has hardened, dress the linoleum flush with the edges of the bench, using a small block plane. The rear uncovered portions of the bench top ends can be pieced in with scrap linoleum after the three units have been mounted on the bench. If through-bolts are used for attaching the wood vise, mount vise before applying the linoleum.

The kneehole cabinet. Notch the shelves of this cabinet at the rear for the corner

posts and then add the casings, framepieces, cleats, facings, top and back in that order. Lip and rabbet the doors, cutting opposite rabbets on each door where they join in the middle. Hang doors with offset hinges, then add the catches, knob, back and side. The side piece, sandwiched between the left end legs of the bench and cabinet forms a storage compartment.

File and screwdriver cabinet. Cut the

MATERIALS LIST—Four-drawer Unit

Quantity	Size and Description	Purpose
4	$\frac{3}{4}$ " $1\frac{1}{2}$ "x26 $\frac{1}{4}$ " pine	vertical side framepieces
4	$\frac{3}{4}$ " $1\frac{1}{2}$ "x21" pine	horizontal side framepieces
2	$\frac{3}{4}$ " $1\frac{1}{2}$ "x15 $\frac{1}{2}$ " pine	front crosspieces
2	$\frac{3}{4}$ " $1\frac{1}{2}$ "x17" pine	rear crosspieces
8	$\frac{3}{4}$ " $\frac{3}{4}$ "x23 $\frac{1}{2}$ " pine	runners
4	$\frac{3}{4}$ " 1"x23 $\frac{1}{2}$ " pine	guides
1	$\frac{3}{4}$ " $\frac{3}{4}$ "x23 $\frac{1}{4}$ " pine	guide support
2	$\frac{3}{4}$ " 1"x26 $\frac{1}{4}$ " pine	vertical facing
4	$\frac{3}{4}$ " 1"x16" pine	horizontal facing and bearers
1	$\frac{3}{4}$ " $1\frac{1}{2}$ "x16" pine	bearer
3	$\frac{3}{4}$ " 5 $\frac{3}{4}$ "x16 $\frac{3}{4}$ " pine	drawer fronts
1	$\frac{3}{4}$ " 7 $\frac{3}{4}$ "x16 $\frac{3}{4}$ " pine	drawer front
6	$\frac{3}{4}$ " 4 $\frac{1}{4}$ "x23" pine	drawer sides
2	$\frac{3}{4}$ " 6 $\frac{3}{4}$ "x23" pine	drawer sides
3	$\frac{3}{4}$ " 4 $\frac{1}{4}$ "x14 $\frac{1}{4}$ " pine	drawer backs
1	$\frac{3}{4}$ " 6 $\frac{3}{4}$ "x14 $\frac{1}{4}$ " pine	drawer back
2	$\frac{1}{4}$ " 24"x26 $\frac{1}{4}$ " plywood	frame sides
1	$\frac{1}{4}$ " 17 $\frac{1}{2}$ "x26 $\frac{1}{4}$ " plywood	frame back
4	$\frac{1}{4}$ " 14 $\frac{1}{4}$ "x22 $\frac{5}{8}$ " plywood	drawer bottoms

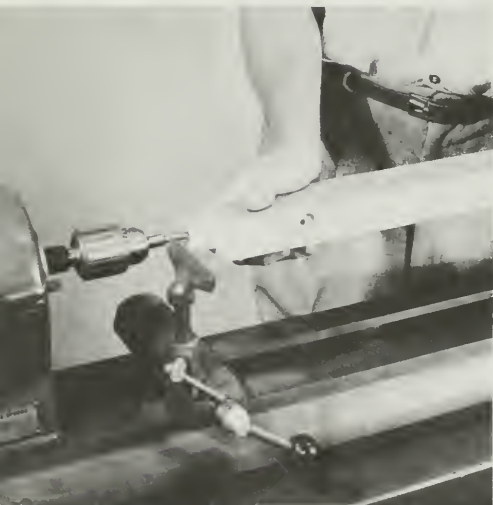
NOTE: Also need 2d and 5d finishing nails, corrugated fasteners and drawer pulls.

MATERIALS LIST—Kneehole Drawer Unit

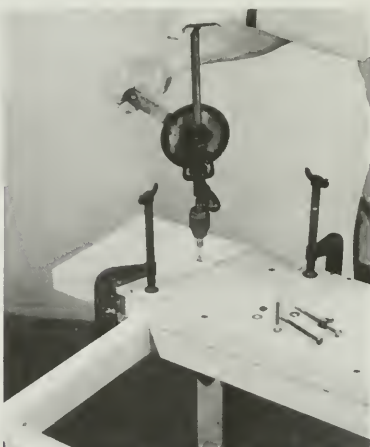
Quantity	Size and Description	Purpose
2	$\frac{3}{4}$ " $4\frac{1}{2}$ "x24 $\frac{1}{4}$ " pine	frame sides
1	$\frac{3}{4}$ " $4\frac{1}{2}$ "x22 $\frac{3}{4}$ " pine	frame back
2	$\frac{3}{4}$ " 1"x4 $\frac{1}{2}$ " pine	frame facings
1	$\frac{3}{4}$ " 1"x22 $\frac{3}{4}$ " pine	frame facing and bearer
2	$\frac{3}{4}$ " 1"x23 $\frac{1}{2}$ " pine	runners
1	$\frac{3}{4}$ " $1\frac{1}{4}$ "x23 $\frac{3}{4}$ " pine	guide
1	$\frac{3}{4}$ " 3 $\frac{3}{4}$ "x22 $\frac{3}{4}$ " pine	drawer front
2	$\frac{3}{4}$ " 2 $\frac{3}{4}$ "x23 $\frac{1}{2}$ " pine	drawer sides
1	$\frac{3}{4}$ " 2 $\frac{3}{4}$ "x20 $\frac{1}{4}$ " pine	drawer back
1	$\frac{3}{8}$ " 20"x22" plywood	drawing board
1	$\frac{1}{4}$ " 20 $\frac{1}{4}$ "x23 $\frac{1}{8}$ " plywood	drawer bottom

NOTE: Also need drawer pulls.

▼ *Forming the notches in bench leg. Note stop clamped to fence for identically locating duplicate notches on the other three legs.*



▲ *To mortise legs for rail tenons, first bore a 1-inch diameter hole, then square it with a chisel. A wooden block supports the work while chiseling.*



▲ *Coinciding holes to bolt the top piece to the rails and stretcher are assured with the clamping setup shown.*

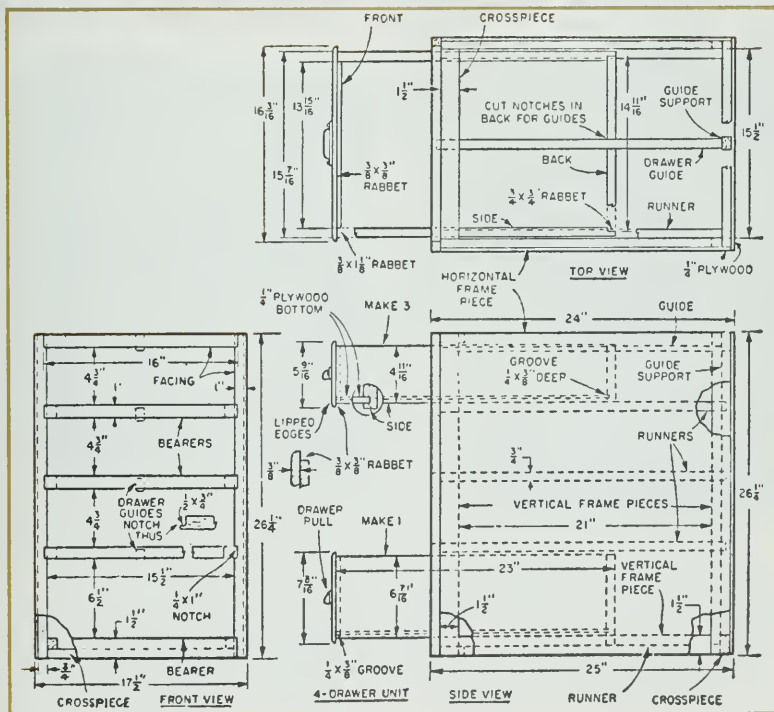
◀ *The depth of the holes in the tenoned rails is governed by the chisel rest holder which acts as a stop for the work.*

Make a Modern Multi-purpose Workbench

3189



◀ Making the side frames for the 4-drawer unit housing. Note notches cut in one rail for the rear crosspieces.



Quantity	Size and Description		Purpose
4	3/4"	1 1/2"x21 1/2" pine	posts and casings
2	3/4"	3/4"x20 1/4" pine	facings
2	3/4"	1 1/2"x10 3/4" pine	framepieces
1	3/4"	1 1/2"x21 3/4" pine	framepiece
1	3/4"	1"x21 3/4" pine	framepiece
2	3/4"	12 1/4"x23 1/4" pine	shelves
2	3/4"	1"x10 3/4" pine	cleats
1	3/4"	10 3/4"x20 1/2" plywood	door
1	3/4"	10 3/8"x20 1/2" plywood	door
1	1/4"	13"x23 1/4" plywood	top
1	1/4"	23 1/4"x21 3/4" plywood	back
1	1/4"	24 1/2"x21 1/4" plywood	side

The image contains two technical drawings of a wooden box, labeled "TOP VIEW" and "SIDE VIEW".

TOP VIEW: This drawing shows the box from above. The overall width is 22 3/4 inches and the overall depth is 23 1/2 inches. The interior width is 20 11/16 inches and the interior depth is 21 7/16 inches. Components labeled include "PULLS" on the left side, "SIDES & BACK (3/4" STOCK)" for the outer walls, "FACING" for the inner surfaces, "RUNNER" for the bottom edge, and "GUIDE" for the internal divider. A "RABBIT" joint is shown on the left side, and "LIPPED EDGES" are indicated at the bottom corners. A dimension of 23 3/8 inches is given for the side wall thickness.

SIDE VIEW: This drawing shows the box from the side. The overall height is 1 inch and the overall width is 25 inches. The interior height is 2 7/16 inches and the interior width is 24 1/2 inches. Components labeled include "SIDES (1/2" STOCK)" for the side walls, "FACING" for the inner surfaces, "RUNNER" for the bottom edge, and "GUIDE" for the internal divider. The "BOTTOM (1/2" PLYWOOD)" is also labeled. A dimension of 3 3/16 inches is given for the side wall thickness.

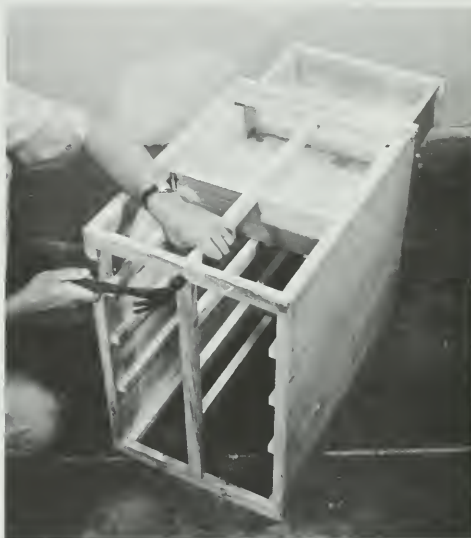
Make a Modern Multi-purpose Workbench

3191



◀ When assembling drawer, nail the sides to the front, then install the bottom and add the back. Glue and cross-nail at the corners.

▼ Working from the bottom up, fit the runners and guides for each individual drawer.



▲ Regulate the slant of the drawing board by merely sliding the kneehole drawer in or out. When not in use, the board can be stored on top of kneehole cabinet located below drawer.

openings in the panel for the outlet boxes before installing this piece in place. Add the plywood facing and tool racks next. Do the wiring before nailing the back in place, running the armored cable behind the trough

backing to the utility box attached to the left rear leg. Install the pilot light in the upper outlet box. Install lid rests and lids for both compartments, then add the filler and stop for the shaving trough lid to the screwdriver rack.

Magazine holder. Make and install the magazine holder next.

Combination tool cabinet and shelves. Begin by dadoing the grooves and rabbeted ends and back edge of the two side pieces. Then nail the shelves, top, bottom and $\frac{3}{8}$ -inch plywood back to the sides, forming the cabinet frame. This cabinet has what appears to be two doors. Fit and hinge the

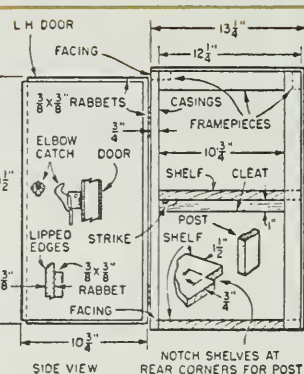
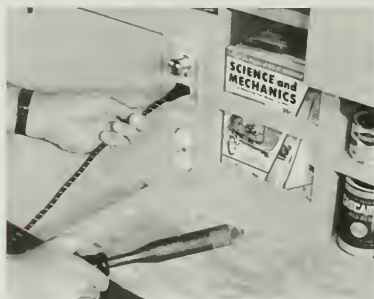
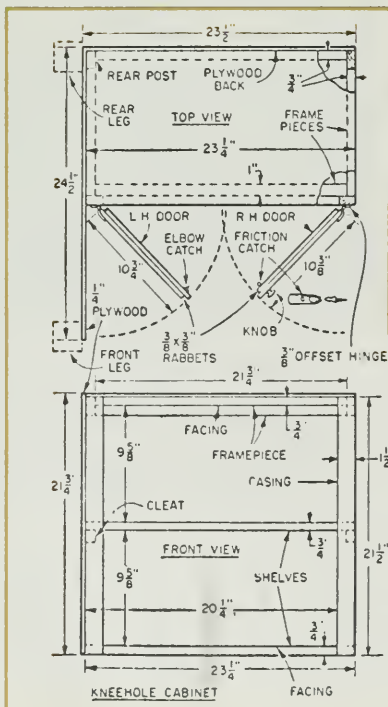


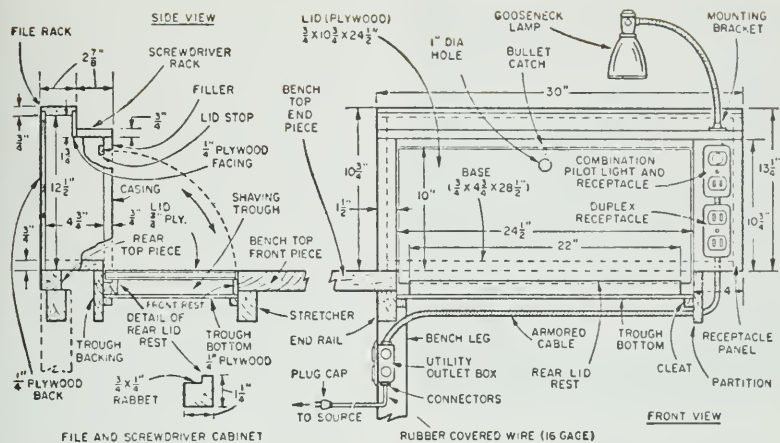
▲ Five or six minutes' use of a rolling pin is sufficient to bond the linoleum to the bench top. Use a toothed applicator of $\frac{1}{8}$ -inch wood for applying the cement to the wood surface.



▲ Hinging the doors to the kneehole cabinet. Install the cabinet so the lower facing strip is flush with the lower stretcher.

▼ Plugging in a soldering iron, glue pot or other electrical device automatically turns on a pilot light which reminds you to disconnect the appliance when finished.



**MATERIALS LIST—File and Screwdriver Cabinet**

Quantity	Size and Description	Purpose
1	3/4" 43/4"x28 1/2" pine	base
2	3/4" 43/4"x12 1/2" pine	sides
2	3/4" 2 7/8"x30" pine	screwdriver and file racks
1	3/4" 1 1/2"x10 3/4" pine	casing
1	3/4" 4"x10 3/4" pine	receptacle panel
1	3/4" 1"x24 1/2" pine	filler
1	1 1/4" 1 1/4"x22" pine	rear lid rest
1	3/8" 1 1/4"x24 1/2" pine	front lid rest
1	3/8" 1"x25 1/2" pine	lid stop
1	3/4" 10 3/4"x24 1/2" plywood	lid
1	1/4" 2 7/8"x30" plywood	facing
1	1/4" 12 7/8"x30" plywood	back
3	utility outlet boxes	
1	combination pilot light and receptacle	
2	duplex receptacles	
3	duplex receptacle plates	

NOTE: Also need armored cable, connectors, gooseneck lamp fixture, rubber covered appliance cord (16 gage), plug cap and bullet catch.



▲ To space the holes for the files and screwdrivers, lay out the tools, as shown, and mark the hole location on the rack stock. Note file rack already in place.

Make a Modern Multi-purpose Workbench

tool panel and install friction catch, stop and knob. Cut out all of the door pieces and before assembling set them up in position on the cabinet frame to see that they line up with the sides, top and shelf. Then glue and nail the door together. When hanging the door, place the hinges on the outside, as shown, and use small bolts instead of wood screws because of the strain placed on the hinges by tools to be hung on the inside surface of the door panel. Cut notches in the hinged side to prevent interference with the tool-panel hinges as the door is closed. Mount the cabinet to the bench top with wood screws through the bottom shelf and add a vertical brace on the back.

Completing the workbench. After piecing in the uncovered portion of the bench top with scraps of linoleum, protect it while painting by covering it with newspaper held in place with masking tape around the edges. Sand the wood and give it a primer

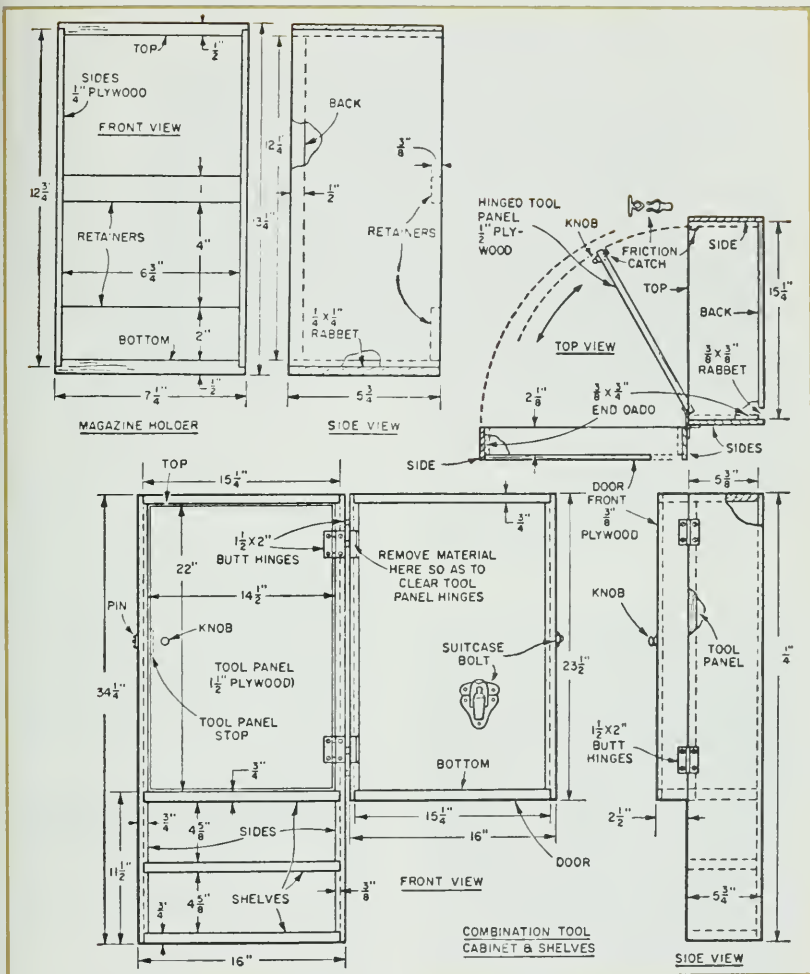
MATERIALS LIST—Magazine Holder

Quantity	Size and Description	Purpose
1	1/2" 6 3/4"x12 1/4" pine	back
2	1/2" 5 3/4"x7 1/4" pine	top and bottom
1	3/8" 2"x6 3/4" pine	retainer
1	3/8" 1"x6 3/4" pine	retainer
2	1/4" 5 3/4"x12 3/4" plywood	sides

MATERIALS LIST—Combination Tool Cabinet and Shelves

Quantity	Size and Description	Purpose
2	3/4" 5 3/4"x34 1/4" pine	sides
4	3/4" 5 3/8"x15 1/4" pine	top and shelves
1	3/4" 2"x24" pine	brace
2	3/4" 2 1/2"x23 1/2" pine	door sides
2	3/4" 2 1/8"x15 1/4" pine	door top and bottom
1	3/8" 1 1/2"x3" pine	tool panel stop
1	3/8" 15 1/4"x34 1/4" plywood	back
1	3/8" 15 1/4"x23 1/2" plywood	front
1	1/2" 14 1/2"x22" plywood	tool panel

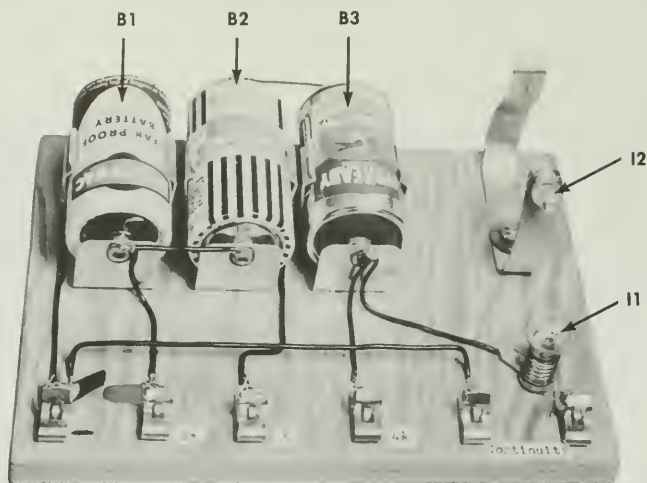
NOTE: Also need flat head screws, friction catch, knobs, butt hinges and suitcase bolt.



coat followed by another sanding and two or three coats of enamel. When thoroughly dry, remove the protective paper and install the drawer pulls and suitcase bolt. If the metal vise you have is not equipped with

pipe jaws, there is sufficient area behind the vise for mounting a small pipe vise. F.H.

See also: DRAWERS; HAND TOOLS; POWER TOOLS; TOOL CADDY; TOOL CHEST; TOOLS; TOOL TECHNIQUES; WIRING, ELECTRICAL; WOODWORKING.



Hobbyist's Low-voltage Power Supply

This handy device is simple, but performs a variety of useful tasks

THIS INNOCENT LOOKING board is actually a low-voltage power supply for transistor experiments, a continuity checker, a bulb tester, an emergency flashlight, a cell tester, and a code practice blinker.

Start with the chassis. As shown in the photographs, the parts are mounted and wired on a 1/2-inch plywood board about 5 inches by 12 inches. The three D flashlight cells, B1, B2, and B3, can be mounted in battery holders, as shown, or simply soldered in series and strapped onto the board. The bulb tester is two strips of metal, brass, copper, or tin, about 1/4-inch wide and 3/4-inch long, soldered to the Fahnestock clips, as shown. The left-hand strip is bent up a little, as shown in the detail photograph.

The continuity tester is a miniature light bulb, 11, screw base type, mounted in a socket and wired in series with a 4 1/2-volt power supply. One socket lug can be sol-

dered directly to the right-hand Fahnestock clip, as shown.

The flashlight cell tester is a 1/2-inch by 6-inch springy metal band bent into a U, and screw-fastened onto the board. A 1.2-volt flashlight bulb, 12, is soldered into a hole near one end of the U, and a brass tack is soldered near the other end. Make the U from any springy metal that's easy to solder. Bend the U so it can be spread or compressed to accommodate any flashlight cell from penlite to D size. All the circuits are shown in the schematic diagram.

It's important to note that, since we are dealing with low-voltage, it is advisable that all connections be soldered, where possible.

Some uses. For transistor experiments, or other low-voltage experiments, the four left-hand Fahnestock clips will give you 4 1/2 volts in 1 1/2-volt steps.

Any flashlight bulb, or radio dial bulb, can be tested, as shown. Even a No. 47 radio dial bulb will glow faintly if the filament is not open. Series strung Christmas tree bulbs can be tested by twisting them into the bulb socket and shorting the continuity clips.

Hobbyist's Low-voltage Power Supply

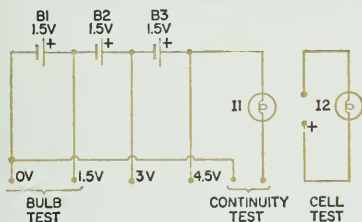
Fuses, low-resistance coils, etc., can be continuity-tested by connecting a pair of test prods to the continuity clips. Variable capacitors can be tested for shorts: I1 will light if the plates in the capacitor are shorted.

Connect a telegraph transmitting key to the continuity clips and you have a "blink-er" code practice set.

Connect a wire jumper across the continuity clips and you have an emergency flashlight.

Any flashlight cell, from penlite to D, can be tested as shown. I2 lights brightly if the cell is in good shape, but glows dimly, or fades out, if the cell is weak. A.T.

See also: BATTERIES; ELECTRONICS.

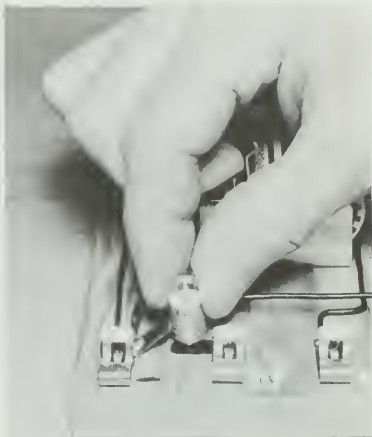


▲ Simplicity of the board schematic diagram belies its usefulness in giving you a quick answer to your "good or bad?" electrical questions in the shop.

PARTS LIST—Construction Time: 1 hour

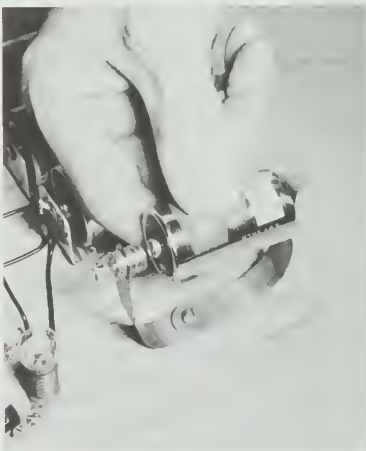
B1, B2, B3	D size flashlight cells
I1	4.9-volt, screw-base miniature lamp (GE 407 or equivalent)
I2	1.2-volt, screw-base miniature lamp (GE 112 or equivalent)
	Battery holders (Keystone No. 175 or equivalent)
	Miniature screw socket for I1 (Leecraft 5-06 or equivalent)
	$\frac{3}{4}$ x $\frac{5}{16}$ -inch Fahnestock clips (Mueller No. 10 or equivalent)

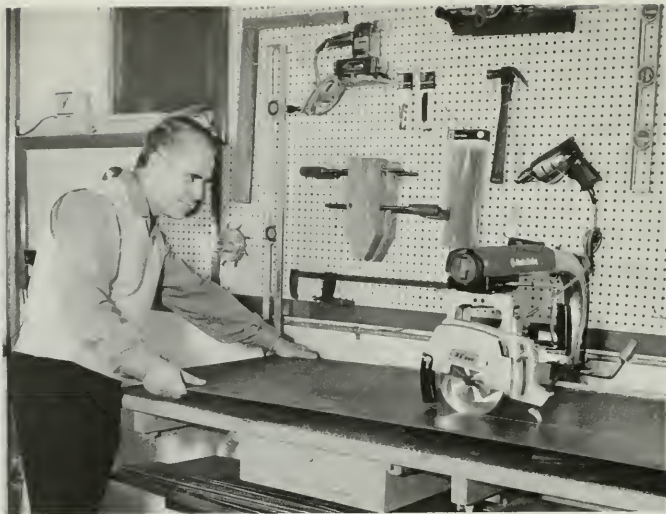
Misc. Scrap metal for cell and bulb testers; plywood for baseboard, nominally 5 x 7 x $\frac{1}{2}$ -inch; round head wood screws; hookup wire; brass tack; washers; solder; etc.



▲ Bulb is quickly tested using the test prods attached to the first two Fahnestock clips. The 1.5 volts is enough to check for an open filament in a bulb.

▼ Flashlight cells are checked in a flash in the fabricated bulb holder and strip. Brightly lighted or dimly lit bulb indicates strength.





How to Lay Out Your Workshop

No matter how much or how little space you have to work with, there is an efficient way to arrange your tools

THE HOME WORKSHOP has become as much a part of the American scene as the automobile. Almost everyone nowadays owns some tools and some sort of shop. The tools may be basic and the shop small. But on the other hand, many people own a large variety of hand and power tools and elaborate shops.

The trouble with most shops, whether large or small, is that they are poorly designed, if designed at all. Most shops just grow as more equipment is added with little thought given to planning. The home workshop enthusiast should obtain the maximum of enjoyment and usefulness from his hobby and this is possible only if the shop is properly planned and laid out.

There are several important factors regarding layout such as size, location and use. Also of importance are lighting, heating and ventilation. The ideal shop is one that affords ample space with good lighting and heating.

Obviously a dark damp basement is not the answer to a craftsman's dream, nor is the cramped shop jammed behind a boiler going to make one jump with joy. With little effort, however, the dingiest shop can be transformed into a showplace. The larger the shop the better, of course, but even the small shop with limited facilities can be made to serve its owner nicely. The space under the basement stairs, for instance, can be put to good use.

The shop will vary with the individual. The person interested only in making model planes could easily be satisfied with a small worktable and nothing more. On the other hand, someone interested in cabinetmaking will need larger quarters to house a good sized workbench, power tools, lumber, etc. For this reason each shop must be custom

workshop drawers: see drawers

workshop, mini: see tool caddies

wrenches: see hand tools

wrought iron railings: see railings, iron

How to Lay Out Your Workshop

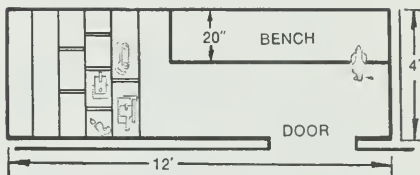
3199

tailored to fill the individual's needs. Certain ground rules apply in all shops, large or small, and this is what will be discussed here.

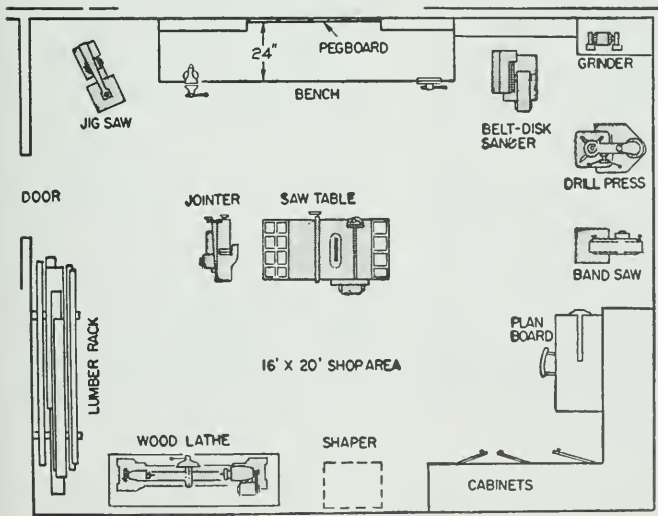
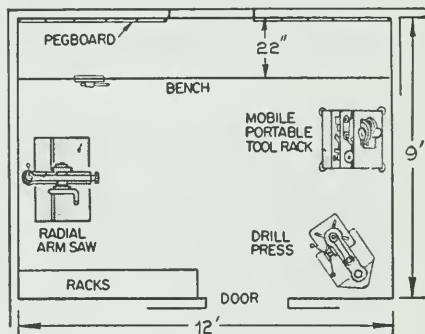
The shop should be located for convenience, preferably in the basement where most utilities are available. The attic or garage may be used as a shop but these may pose a bit of a problem. The attic might be fine for light and heat but noise would be a factor if power tools were to be included. If you have no other choice, look into sound absorbing materials on which to mount your machines. These are usually special cork or felt formulations and they work very well. Check the yellow pages under Vibration Control for a source of supply.

Heating, lighting, humidity. The only problem connected with the garage is heating. An unheated garage can become mighty cold in winter. If your present heating system can be extended, fine. If not, an electric space heater may be the answer. Keep away from oil or coal stoves as they can be a fire hazard in the workshop.

If the shop is on or above grade, chances are that you will have plenty of light and ventilation. The basement may be lacking in light because of the size and quantity



▲ A snug, condensed workshop can be built under the basement stairs. Use shelves beneath the treads to store small power and hand tools.



▲ This layout utilizes the available space efficiently. The radial arm saw is on casters so it can be rolled into a center position in front of the bench occasionally to handle longer workpieces. For very long workpieces it can be rolled next to the door.

◀ This fairly large layout places the table saw and jointer in a central position, leaving plenty of room all around for work to move into the saw and out of it.

of windows. Basements never seem to have enough. The answer is artificial light. This could take the form of incandescent or fluorescent fixtures. The choice depends on the individual.

From a practical standpoint, the fluorescent fixture is the better choice. The lamps burn cooler, give light which is equal to daylight and are more efficient than ordinary bulbs. Because most basement ceilings are low, the incandescent lamp with reflector casts long dark shadows. The fluorescent lamp on the other hand gives a soft diffuse light practically eliminating shadows.

The number of fixtures depends on the size of the shop. One fixture should be placed over the workbench with the rest spaced equally throughout the shop. Twin

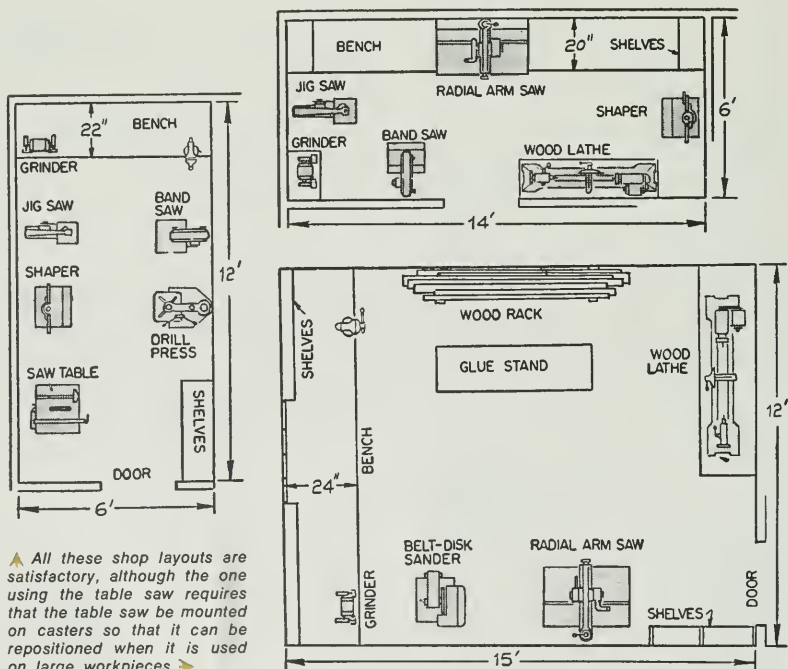
How to Lay Out Your Workshop

40 watt fixtures are recommended, one for every 100 square feet of floor space if the walls are light colored, otherwise one for every 75 square feet.

In the summer, humidity is a problem in most basement shops. If you are plagued with excessive dampness and your tools begin to rust, a dehumidifier will be a good investment. These operate quietly and most have a dial allowing you to set the desired degree of humidity.

Shop size. The size of the shop depends on intended use and space availability. Naturally, the larger the shop the better, but more often than not, space is at a premium so make the best possible use of whatever space you have.

A shop located under the basement stairs



▲ All these shop layouts are satisfactory, although the one using the table saw requires that the table saw be mounted on casters so that it can be repositioned when it is used on large workpieces. ➤

How to Lay Out Your Workshop

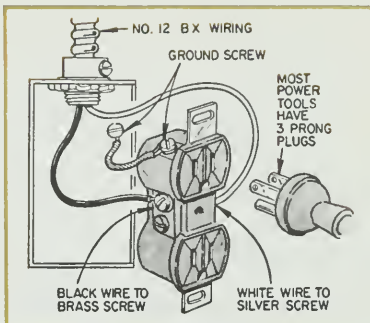
is about the smallest a person should consider. And here every inch of space counts. A tool rack against the rear wall will hold most hand tools. A shelf at the bottom of the tool board, about 6 inches above the bench, can be used to store glue, paints, nails, screws and other objects that cannot be hung. Drawers or open shelves in the base of the workbench will handle your portable power tools and the bottom of the steps can be extended forming bins to hold additional tools. One light fixture should be ample. An outlet strip across the rear of the bench just below the shelf will handle your power needs. A vise should be located at the open end of the bench.

When the shop is limited in space, combination power tools should be considered. A saw-jointer combination is a practical tool which will enable you to handle basic woodworking operations. Since both tools are mounted on one base, less floor space is required.

For a complete shop in a very limited space, a combination machine is ideal. This machine takes the place of seven power tools and can be set up in the smallest shop. A workbench and some hand tools are the only additions needed to make your shop complete.

Positioning equipment. Whenever possible, the workbench should be placed near a window to take advantage of light and air. If necessary, a tool board can be built with an opening for the window from peg-board.

Table saws should be placed at the center of the room whenever possible so large boards can be ripped and cross-cut without difficulty. Likewise, the radial arm saw should be located along a wall without obstructions on either side and, if possible, adjacent to a door so extra long boards can be handled with ease. When this is not feasible, consider casters for this and other machines so they can be moved about as needed.



▲ Install grounding plugs in your shop. Almost all shop tools require them. Even better are outlets equipped with locks, especially if there are young children in the house.

Machines such as the grinder, lathe, shaper and drill press can be placed in corners; generally, they are not moved when used.

Machines placed on the floor away from walls should have ample space around them so they don't interfere with each other. Outlets for these machines are placed at the ceiling or on drop cords thus eliminating the hazard of wires running across the shop floor. If children have access to the shop, it would be wise to have a locking switch to power outlets to prevent inquisitive little hands from turning on a power tool. Some machines have key switches.

The electrical supply to the shop should be ample to handle lighting and motors adequately. Lighting circuits should be separate from the tool outlets. Use one branch circuit for lighting and at least one and possibly two for the power outlets. Be sure all outlets are of the grounded type and that all power tools have a grounding plug.

J.C.

See also: CIRCUITS, ELECTRICAL; ELECTRICITY; LUMBER; POWER TOOLS; SHELVES; TOOL CADDY; TOOL CHEST; TOOLS; TOOL TECHNIQUES; WIRING, ELECTRICAL; WOODWORKING; WORKBENCH.

Wall-mounted Workshop Desk

This handy shop cabinet with a fold-down reading surface can stand on a table top or be mounted on the wall

THIS CABINET CAN BE HUNG on your shop wall or placed on your desk.

While the cabinet shown here was made of pine and plywood and then painted, a cabinet wood finished with clear lacquer could be used for the outer parts and lid to harmonize with your desk. Either way, pre-sand parts with 2/0 paper before assembly to ease the final sanding.

Cabinet compartment. Start by cutting the compartment bottom to size as given in the Materials List. Then, with a shaper or molding head cutter in your circular saw, cut a cove (to hold pencils) along front edge of the bottom. Bevel the front edge 10°. After sawing the $\frac{3}{8}$ -inch plywood compartment ends, top, back and partition to size, setup the dado head cutter in your circular saw to take a $\frac{3}{8}$ -inch width cut and saw $\frac{3}{8}$ x $\frac{3}{8}$ -inch rabbets at the ends of the bottom piece. Also, cut a $\frac{3}{8}$ -inch deep dado in the bottom and a $\frac{3}{16}$ -inch deep dado in the top for the partition. With 1-inch lath nails and glue, join the compart-

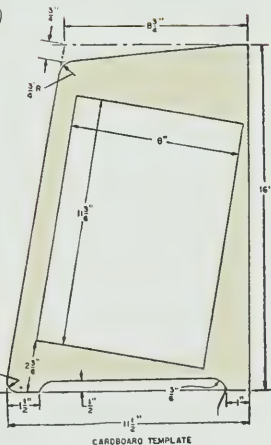
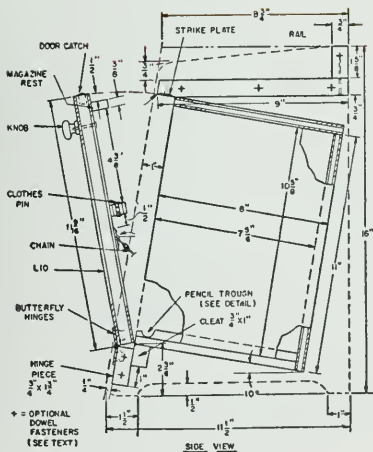
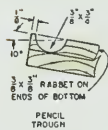
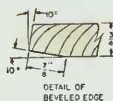
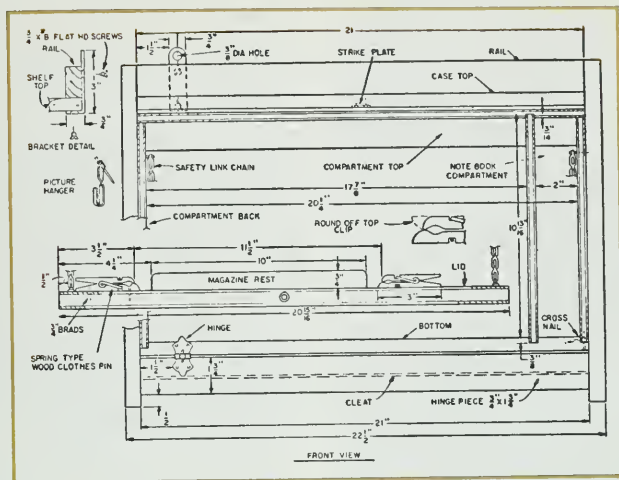


▲ Here are handbooks and hobby magazines waiting for your quick selection. Indexing notebook on the right tells where to find that project you want to work on. Clips hold magazines open to page desired.

▼ Cabinet top is convenient place to keep miscellaneous materials for the job at hand.



Wall-mounted Workshop Desk



ment back to the bottom, then assemble the ends and top. Immediately remove excess glue with a moist cloth.

Cabinet case. Make a full-size drawing of the case side on cardboard as detailed in the drawing. Cut this out to form a template so that you can transfer the shape of the side to the wood and mark the location of the compartment on the sides.

Cut side pieces simultaneously on a band saw, after nailing stock together in what will be scrap-wood cutoffs. Place template on inner surface of the sides to mark compartment locations. Attach the compartment with glue and 1-inch lath nails, then insert the partition, fastening to top and bottom with 1-inch lath nails. Cut the remaining case parts to dimensions given in front and side views. Bevel the front edge of the top 10°. Glue ends of the cleat, hinge piece, top and rail and join to sides, using 7d finishing nails. Fit the lid next, then glue and brad the magazine rest to it.

Now, sand all surfaces with 3/0 paper and smooth with 6/0 paper. Dust off, apply

a primer coat of flat white, and sand with 6/0 paper. Next, set the nailheads, fill holes with spackling putty, and smooth with 6/0 paper. Dust thoroughly and apply two coats of enamel.

Install the door catch, knob and lid hinges. Mortise in the door catch strike. Bend the lower link of each lid-supporting chain outwards and attach to the lid with round head screws. Locate upper-link screws so the lid will slant about 4° below horizontal.

Take apart two wooden clothespins, which will hold open a copy of a magazine or booklet on the lid, and brad the lower clips in place. Round the upper clips so they won't obscure the type next to the margins, then reassemble the clothespins.

Place the case on a bench top, desk, shelf or, using brackets and picture hooks, suspend it on a wall so the opened lid will be at waist level.

F.H.

See also: BOOKCASE; DRAWERS; FURNITURE, INDOOR; LUMBER; SHELVES; STORAGE; TOOL TECHNIQUES; WOODWORKING; WORKBENCH.

MATERIALS LIST

Quantity	Size and Description	Purpose
1	3/4" 7 5/8"x21" pine	compartment bottom
2	3/4" 11 1/2"x16" pine	case sides
1	3/4" 9"x21" pine	case top
2	3/4" 1 3/4"x21" pine	case rail and hinge pieces
1	3/4" 1"x21" pine	case cleat
1	3/4" 3 5/8"x10" pine	case magazine rest
1	3/4" 11 9/16"x20 15/16" fir plywood	case lid
1	3/8" 8"x21" fir plywood	compartment top
2	3/8" 8"x10 5/8" fir plywood	compartment ends
1	3/8" 11"x20 3/4" fir plywood	compartment back
1	3/8" 7 5/8"x10 13/16" fir plywood	compartment partition
4	3/4" #8 flat head screws	
2	1" #7 round head screws	
4	5/8" #6 round head screws	

NOTE: Also need butterfly hinges, clothespins, bullet type door catch, safety chain, knobs, lath nails, 7d finishing nails, brads, glue and finishing materials.

How to Decorate with Felt and Yarn

Techniques you can use to make impressive wall hangings, pillows or purses

IF YOU DISLIKE fiddling with a needle and thread, but enjoy creating wall hangings, purses or pillows, felt may be the material you are looking for. Most of these projects can be done almost entirely with glue, and their simple construction also allows you to improvise and be creative in design and color.

Stichiered wall hangings always look impressive because it is obvious a great deal of time and patience went into their construction; but now, with the use of glue, rug yarn and felt, it is possible to get the same effect in a few hours.

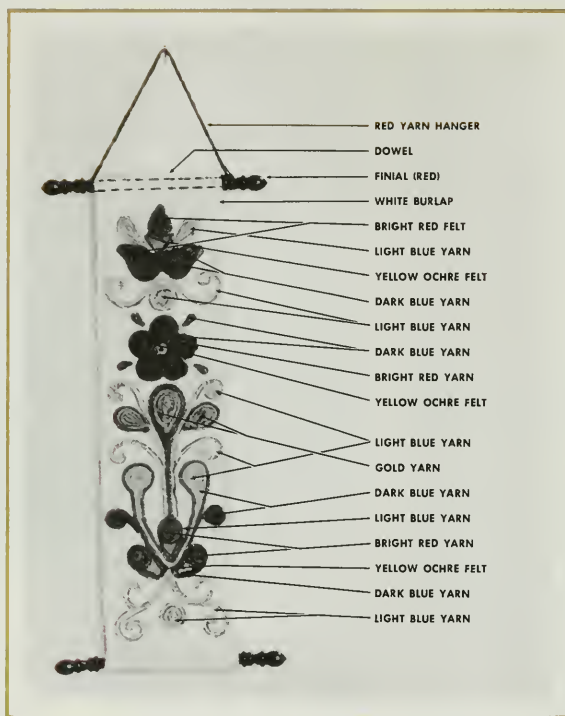
To make the Pennsylvania Dutch-style wall hanging you will need white burlap 28 inches long and 8 inches wide, Wilhold "fat" craft glue, heavy rug yarn in medium and light blue, ochre and red, scraps of ochre felt, two pieces of 1/2-inch doweling cut 6 inches long, four decorative finials, red paint (enamel or acrylic), and a fabric protector.

First, prepare the burlap by folding over one inch of the two lengthwise sides and press. Squeeze some glue into the fold to hold it securely. Lightly pencil in the de-

sign, then start to glue. Cut pieces of ochre felt and glue into place. Next, fill in the yarn designs with pencil and squeeze some glue into the shape, making sure to glue-fill the entire area. Press a yarn end of the appropriate color into the center of the glued area, then wind the yarn around and around in the design you wish until the shape is filled with yarn. Continue until all the solid areas are filled with yarn. Last, squeeze a thin glue line on all the single lines of the design, then press yarn into place over the glue. After it dries, spray with a fabric protector to keep the fabric dust and grime free.

Glue the decorative finials onto the ends of the dowels, paint red and let dry. Lay the burlap face down on a table and turn two inches at the top and bottom over the dowels and glue fabric to itself in place. Tie red yarn around both ends of the top dowel to make a hanger.





◀ The color pattern of Pennsylvania Dutch-style wall hanging. You can use same process to see your original designs appear as stitch-eried hangings in less than a quarter of the time it would take to needlepoint them.

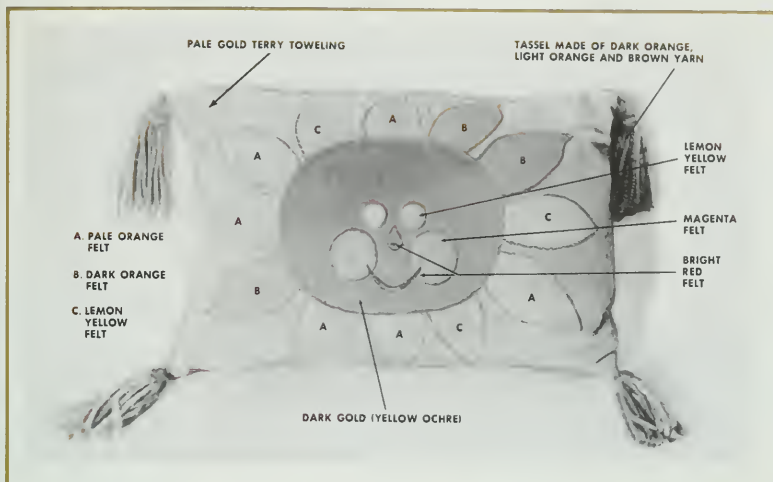
Other designs of wall hangings can also be executed in the same manner and it is a perfect opportunity for you to be creative and come up with original designs. But there is more to working with felt than designs for your wall.

With the addition of a few more materials, felt bags are also easy to make and design yourself. You can vary the size of the bag to fit your purpose, and any size can be easily assembled in less than an hour.

To create a purse that is one foot square when finished, start by cutting a piece of iron-on Pellon 12 inches wide and 26 inches long. Lay the Pellon, shiny side down, on

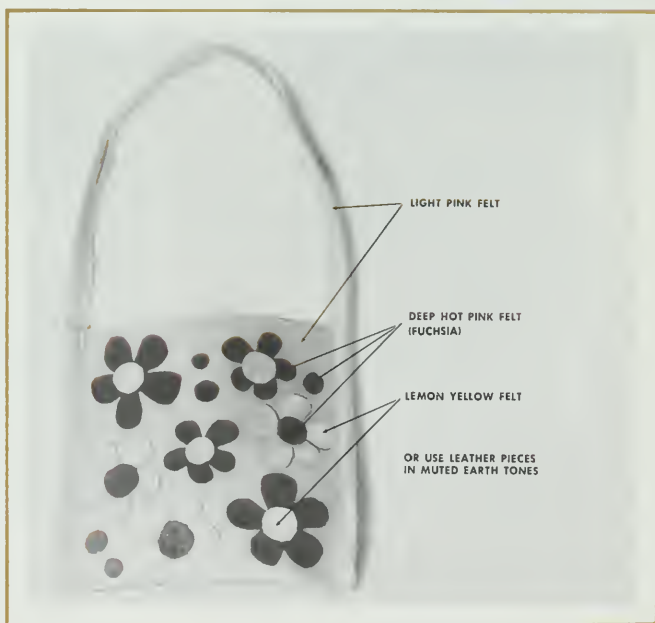
a larger piece of felt. Slowly iron over Pellon until it is securely stuck to the felt and cut away the excess felt.

Using a paint brush or your fingers, smear glue at each end of the Pellon. Fold over one inch at each end, press to hold, and fold entire piece in half to form the bag. After pinning to hold sides in place, either hand or machine stitch the bag closed at the ends. Cut a piece of felt 54 inches by two inches for the shoulder strap. Fold the strap in half, lengthwise, and pin to hold. Place the sides of the purse into the center of the strap at both ends, pin to hold and then sew. Continue to sew along the strap until you reach other side of bag.



▲ To make pillows, simply get six hand towels 24 x 16 inches and two inexpensive bed pillows. Make two smaller pillows from each pillow by sewing several times through the middle. Cut the pillow in half, being careful to cut in between the sewn lines. Then stuff the pillows with feathers or kapok and decorate in any manner you wish with the same process as bag or wall hanging. Sew up the open end of the pillow and it is done.

➤ Easy construction makes this felt bag fun to make, and adjustable size allows you to make it fit your needs.





◀ Fringe is easy to add to the finished bag by placing strips on top of each other to give a layered appearance. There is no need to fringe both sides of the bag as friction between you and bag, while wearing it, just rubs the fringe off.

You can cut decorative flowers, or any shape you wish, from scraps of felt and lay them down on the bag until the design looks good to you; then simply glue them down. (If you accidentally put glue in the wrong place, carefully blot it away with damp paper towel.)

If you would rather put fringe on the sides of the bag, cut several felt strips the width of the bag and three inches long. Cut fringe to within $\frac{1}{2}$ -inch of the top of the strip. Brush glue on uncut section, press into place on the bag.

Begin to layer at the bottom and work

your way up. Layer assorted shades of fringe until the bag is totally covered on one side. No need to put fringe on the back of the bag as close friction with you and clothing will just rub it away eventually. The bag should be coated with a fabric protector to prevent grime, but if it does get dirty, it can be dry cleaned.

Using the same basic process, pillows are also easy to make and design yourself. For less than \$3.50 and the addition of a few materials, you can fashion a pillow to suit any mood.

See also: CRAFT PROJECTS.



ANATOMY OF A HOUSE

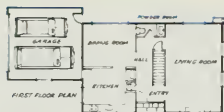
ACCURATELY SHOWN AND
CLEARLY EXPLAINED IN

STRUCTURAL TRANSPARENCIES

by

LAWRENCE MICHAELS
ARCHITECT A.I.A.

ALPHABETIC INDEX



DESCRIPTION OF PLATES

PLATE 1

Framing drawing in perspective showing rough framing of exterior of house on foundation wall complete with footing drains and crushed stone. This drawing also shows the various materials (rafters, plywood sheathing, building paper and roof shingles) that go into making the roof of the house.

Site plan indicating house and driveway locations; survey information, zoning setback requirements (front, side and rear); utilities (sewer, water main, electric and telephone lines); and drywells for roof leaders.

PLATE 2

Cut-away view showing rough framing of exterior and interior of house. Origin of house utilities and mechanical systems; emphasis on heating and air-conditioning system and chimney/fireplace detail.

Basement plan indicating arrangement of rooms, garage concrete floor slab and heater room equipment.

PLATE 3

Cut-away view showing origin of house utilities; emphasis on heating and air conditioning systems and on plumbing systems and stair detail.

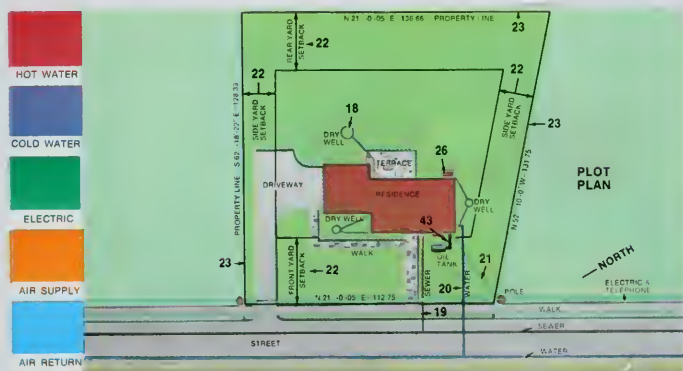
First floor plan indicating arrangement of rooms, attached two-car garage and kitchen layout.

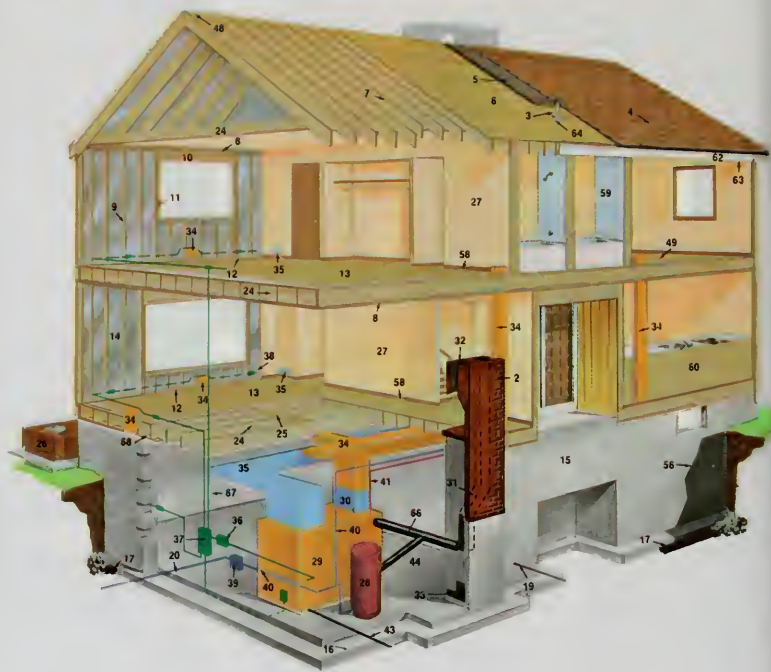
PLATE 4

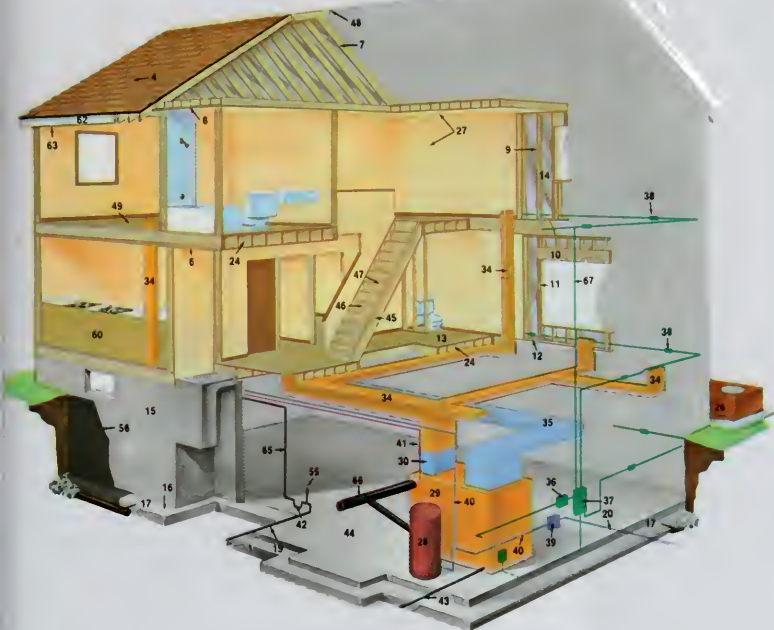
Cut-away view showing emphasis on plumbing system at kitchen and bathrooms; also emphasis on electrical system indicating convenience outlets, wall switches and light fixtures.

Second floor plan indicating arrangement of rooms, garage roof and bathroom layouts.

NAME	NO.	PLATE NO.
Air conditioning coil	30	2,3
Air conditioning compressor and condenser	26	1,2,3,4
Ash dump and clean-out	33	2
Baseboard	58	2
Blocking	25	2
Boiler flue	31	2,3,4
Boiler fuel line	43	1,2,3,4
Breeching	66	2,3,4
Building paper	5	1,2
Ceramic tile	59	2
Chimney cap	1	1
Chimney	2	1
Circuit breaker panel (fuse box)	37	2,3,4
Cold water pipes	40	2,3,4
Concrete slab	44	2,3,4
Dampproofing	56	1,2,3,4
Drywell	18	1
Electric convenience outlet	38	2,3,4
Electric and telephone lines	21	1
Electrical wiring	67	2,3,4
Fascia	62	1,2,3,4
Finish floor	49	2,3,4
Fireplace flue	32	2,4
Flashing	64	1,2
Floor and ceiling joists	24	2,3,4
Foil back insulation	14	1,2,3
Footing	16	1,2,3,4
Footing drain and crushed stone	17	1,2,3,4
Foundation wall	15	1,2,3,4
Gutter	54	4
Gypsum board	27	2,3,4
Header	10	1,2,3
Heater and fan units	29	2,3,4
Heat and cold air supply ducts	34	2,3
Hot water heater and storage tank	28	2,3,4
Hot water pipes	41	2,3,4
House trap	42	3,4
House vent	55	3,4
Jack studs	11	1,2,3
Kitchen cabinets	60	2,3,4
Leader (down spout)	53	4
Light fixtures	52	4
Louver	57	1
Main disconnect	36	2,3,4
"P" trap	50	4
Plumbing vent	3	1,2,4
Plywood sheathing	6	1,2
Plywood subfloor	13	1,2,3
Rafter	7	1,2,3
Return air ducts	35	2,3
Ridge board	48	1,2,3
Riser	46	3
Roof shingles	4	1,2,3,4
Setbacks	22	1
Sewer	19	1,2,3,4
Siding	61	cover
Sill	68	1,2
Soffits	63	1,2,3,4
Soil line	65	3,4
Sole or bottom plate	12	1,2,3
Stringer	45	3
Stud	9	1,2,3
Survey information	23	1
Tread	47	3
Top plate	8	1,2,3
Wall switch	51	4
Water main	20	1,2,3,4
Water meter	39	2,3,4





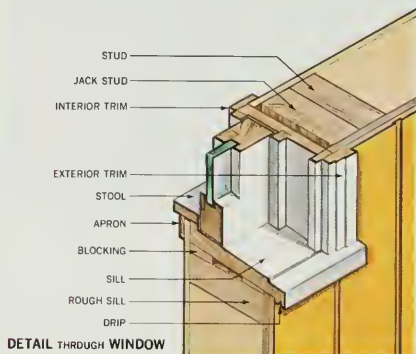
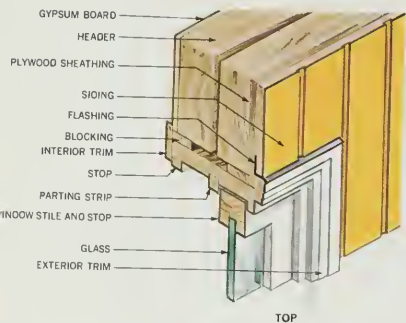
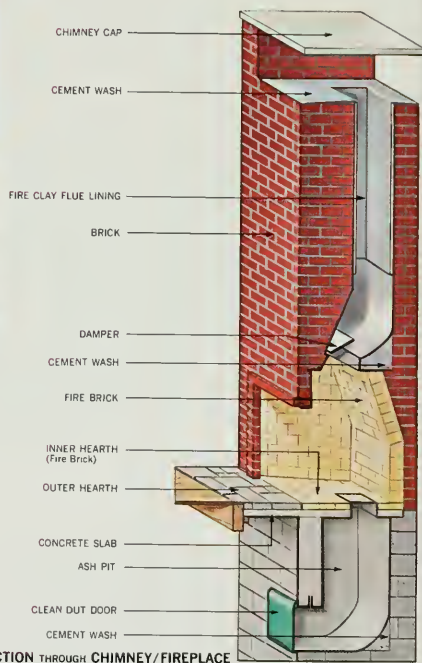
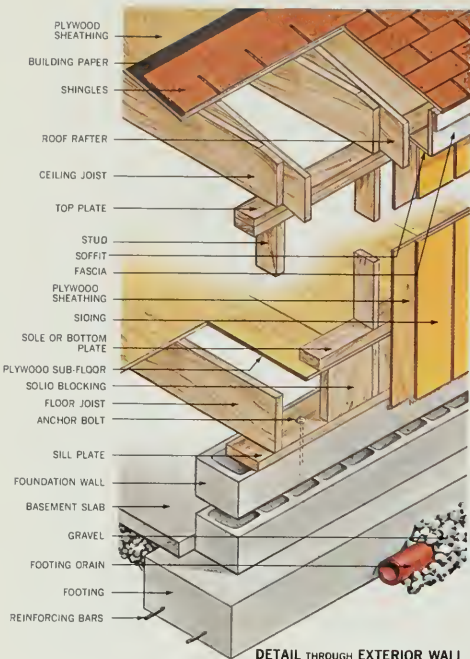




NUMERICAL INDEX AND GLOSSARY

1. **CHIMNEY CAP:** Prevents downdrafts and helps keep out rain water.
2. **CHIMNEY:** Fireproof supporting structure around fireplace and heater flue
3. **PLUMBING VENT:** Supplies the drainage system with air to prevent siphonage of traps.
4. **ROOF SHINGLES:** Outermost protective covering of roof, usually of asphalt, wood, slate, or tile.
5. **BUILDING PAPER:** Moisture barrier. Also prevents air penetration through any cracks that might exist
6. **PLYWOOD SHEATHING:** Acts as lateral bracing for roof or walls and as nailing surface and support for shingles or siding
7. **RAFTER:** Framing member that supports roof, typically spaced at 16" on center
8. **TOP PLATE:** Supports floor or ceiling joists and roof rafters, transferring load to top of studs that are nailed to it.
9. **STUD:** Vertical framing that carries roof and floor load to foundation and to which interior and exterior materials are attached, typically 2x4s spaced at 16" on center
10. **HEADER:** Distributes load from above door or window openings to jack studs at each side.
11. **JACK STUDS:** Receive load from header.
12. **SOLE OR BOTTOM PLATE:** Nailers for studs.
13. **PLYWOOD SUBFLOOR:** Provides lateral bracing for floor joists and provides support for finished floor placed over it.
14. **FOIL BACK INSULATION:** Provides thermal and moisture barrier between outside and inside of building.
15. **FOUNDATION WALL:** Concrete block, poured concrete, or masonry wall that supports roof, floor, and wall structures above, and where below grade serves as a retaining wall.
16. **FOOTING:** To prevent settling, distributes weight of building evenly to ground, must be below frost line.
17. **FOOTING DRAIN AND CRUSHED STONE:** To remove ground water from around building carrying it to drywell, storm sewer or onto finished grade away from house.
18. **DRYWELL:** Temporary storage for water from roof gutters and leaders or footing drains until water can be absorbed into ground.
19. **SEWER:** Carries sewage to municipal sewer, or to house septic system.
20. **WATER MAIN:** Cold water line from public water supply or well; usually of copper piping.
21. **ELECTRIC AND TELEPHONE LINES:** From utility companies, run either overhead or underground from pole to electric meter.
22. **SETBACKS:** (front, rear, and side) Determined from local zoning regulations.
23. **SURVEY INFORMATION:** Legal boundaries of property as established by licensed surveyor
24. **FLOOR AND CEILING JOISTS:** Horizontal structural members that support floors and ceilings.
25. **BLOCKING:** Solid blocking acts as bracing to keep joists from twisting; cross bridging is an acceptable alternate.
26. **AIR CONDITIONING COMPRESSOR AND CONDENSER:** Unit cools refrigerant for air conditioning coil (Item #30)
27. **GYPSUM BOARD:** Interior wall surface material consists of a gypsum core sandwiched between outer skin of paper or vinyl to which paint, wall paper, or tile can be applied.
28. **HOT WATER HEATER AND STORAGE TANK:** Thermodynamically controlled heater, either gas, electric, or oil fired.
29. **HEATER AND FAN UNIT:** Boiler in unit provides heat to warm air forced through ducts by fan in heating season. Boiler operates on electric, gas, or oil. In cooling season, only fan operates in conjunction with air conditioning coil (Item #30).
30. **AIR CONDITIONING COIL:** Cooling unit to cool air blown over coil by fan through supply ducts
31. **BOILER FLUE:** Terra cotta or asbestos lined; carries smoke and hot gases from heating unit and hot water heater to open air
32. **FIREPLACE FLUE:** Terra cotta or asbestos lined, carries smoke and hot gases from fireplace to open air
33. **ASH DUMP AND CLEAN-OUT:** Storage bin for ashes and soot
34. **HEAT AND COLD AIR SUPPLY DUCTS:** Carries hot or cold conditioned air to various rooms. These ducts are insulated.
35. **RETURN AIR DUCTS:** Carries air back to heating and fan unit to be reheated or cooled. These ducts are not usually insulated
36. **MAIN DISCONNECT:** Provides a single switch that will connect or disconnect all electricity within the house and provides automatic protection against severe overloads and short circuits
37. **CIRCUIT BREAKER PANEL:** (fuse box) Contains fusible breakers that shut off an electrical circuit when overloaded or shorted out preventing fire or damage to wiring. Also provides means to shut off electricity in various parts of the house
38. **ELECTRICAL CONVENIENCE OUTLET:** Electric power source in which lamps, appliances, etc., may be plugged in.
39. **WATER METER:** Device to measure quantity of water flowing from water supply into house
40. **COLD WATER PIPES:** Carries cold water to plumbing fixtures and appliances, are usually copper
41. **HOT WATER PIPES:** Carries hot water to plumbing fixtures and appliances; are usually copper.
42. **HOUSE TRAP:** Prevents sewer gas from entering house soil lines
43. **BOILER FUEL LINE:** Supplies boiler in burner with fuel from buried oil tank or for natural gas from line in street.
44. **CONCRETE SLAB:** Usually 1:2:4 concrete 4" thick with 6" x 6" #10 welded wire mesh reinforcing.
45. **STRINGER:** Supporting side structure for stairs.
46. **RISER:** Vertical closer under treads of stairs.
47. **TREAD:** Horizontal stair member usually constructed of oak.
48. **RIDGE BOARD:** Board to which rafters are secured at apex of roof.
49. **FINISH FLOOR:** Carpet, wood, ceramic tile, resilient tile, linoleum, etc.
50. **"P" TRAP:** Water in loop of trap prevents gas in soil lines from escaping through fixtures. Also catches debris and provides a place to clean out lines.
51. **WALL SWITCH:** Controls lights, fans, convenience outlets or appliances; constructed of metal or plastic.
52. **LIGHT FIXTURES:** Recessed, surface mounted, or hung.
53. **LEADER:** (down spout) Vertical conductor for carrying water from gutters to ground or drywells, usually of aluminum, galvanized steel or copper
54. **GUTTER:** Horizontal member collecting water from roof; usually of wood, aluminum, galvanized steel or copper.
55. **HOUSE VENT:** Supplies air to prevent siphonage of house trap
56. **DAMP-PROOFING:** Cement pargeing with asphalt coatings.
57. **LOUVER:** To ventilate attic space.
58. **BASEBOARD:** Trim board covering wall to floor intersection, usually made of wood, vinyl or tile
59. **CERAMIC TILE:** Glazed clay material impervious to water
60. **KITCHEN CABINETS:** Usually constructed of wood, metal, or plastic laminate
61. **SIDING:** Outermost protective covering of walls, usually of wood.
62. **FASCIA:** Covers exposed ends of rafters.
63. **SOFFITS:** Covers underside of roof overhang
64. **FLASHING:** Metal or vinyl lining used as seal for junctions of wall and roof intersections, and around chimney and vents.
65. **SOIL LINE:** Carries solid waste and effluent to house sewer.
66. **BREECHING:** Connection between heater unit, hot water heater, and boiler flue.
67. **ELECTRICAL WIRING:** Usually BX (armored) cable or insulated nonmetallic sheathed cable.
68. **SILL:** Transfer loads and wind stresses from the wood frame to the foundation wall.

TYPICAL CONSTRUCTION DETAILS



BOTTOM

INDEX

NUMBER PRECEDING SLASH (00/) DESIGNATES VOLUME NUMBER

A

Abrasions, emergency treatment, 8/1087
 Abrasives

Arkansas stone, 4/500
 in furniture refinishing, 7/1059
 how to choose, 1/25; 16/2348
 pumice, 7/1061, 16/1071
 rottenstone, 7/1061, 1071
 sandpaper, types of, 15/2260
 scythe stone, 2/195
 for tool sharpening, selecting, 16/2346

Abrasive wheel, on electric drill, 6/862

Absorption
 coefficients of, 4/522
 of sound, 4/521

Acanthus leaf, carving, 4/501

Acceleration, auto
 delay in, 4/469

in variable engines, 1/157

Accelerator pump, carburetor, 4/472

Accessories
 in ceramic tiling, 2/198

home video, 20/2978

power tool, 14/2056

for saber saw, 15/2233

Accidents
 in boating, 15/2238

in camping, 8/1085

Accident victims
 getting to shore, 15/2248

picking up from water, 15/2239

AC generator: *See* Auto alternator

Acidity
 of soil, 11/1575

of swimming pool water, 18/2629

Acid-soil plants, fertilizer for, 7/1049

Acorn flour, as food, 12/1790

Acoustical tile ceiling, 4/517, 521

Acoustic resonator, 7/952

Acoustic suspension system for
 stereo speakers, 17/2505

Acrylic
 caulking compounds, 4/514

resin adhesive, 1/39

Acrylic sheet
 étagère built of, 14/2013

finishing edges of, 14/2010, 2013

game board of, 8/1208

for molding plastic prints, 15/2311

for shower door, 16/2419

wine rack of, 14/2009

as window glazing, 17/2577

Action photography, 13/1943

Adapter
 for drill bit on radial arm saw, 14/2099

electric wall receptacle, 21/3122

Additions, home
 dormer, building of, 6/831

fireplace, installation of, 7/1080

garage conversion, 8/1229

new front, 9/1372

planning for, 1/32

room, 9/1377

second story, 15/2164

Additives
 battery, 2/216

in engine oil, 2/230; 7/989; 12/1747

in gasoline, 7/1010

vinyl, as bonding agent, 5/663

Adhesives, 1/39

in basement insulation, 2/187

in boat building, 2/287, 308

for ceiling tiles, 4/524

in ceramic tiling, 2/194

in countertop tiling, 4/543

epoxy, for tile-setting, 18/2721

for fabric, 13/1894

flexible spray, 1/44

neoprene-base, 1/42; 2/208

for plywood, 2/281

selecting, 145

solvent type, safety in use of, 2/200

spray, 8/1217

types of, 1/39

Aerosol paint, 4/492; 12/1854;
 14/2012, 2154

Agarita berries, wild, as food,
 12/1791

Agate (quartz), 7/951

Aggregate
 in concrete work, 5/657

as ground cover, 17/2526

Air
 circulation in homesite, 10/1400

source for scuba diving, 16/2324

Air bleed
 in carburetor, 4/479

in intake manifold, 20/2940

Air cannon, making, 15/2280

Air cleaner, auto
 carburetor, 4/580

thermostatic, 1/46, 116; 7/1007;
 9/1347

washing, 7/1011

Air compressor, for painting auto,
 12/1819

Air conditioning
 central, using heating ducts for,
 8/1156

choosing correct type, 1/51

energy efficiency rating, 1/56

fuses for auto, 6/913

heat pump used for, 8/1158

for new home, 10/1406

seasonal maintenance of, 1/61

Aircraft, ultralight, 1/64

Air filter
 auto, changing, 7/1051

for darkroom, 5/720

Air filtration, using heating ducts for,
 8/1156

Air-fuel mixture
 in boat cylinder, 7/976

in carburetor, 4/479

in oil loss, 12/1745

overheated, 9/1347

Air gap, in electronic ignition
 system, 10/1436

Air horn, carburetor, 4/477;
 7/1006

Air leak, in carburetor gasket, 4/478

Air mattresses, for camping, 3/416

Airplane model, Wankel engine for,
 15/2196

Airplanes, ultralight, 1/64

Airports, and noise pollution,
 12/1735

Alarms
 home security sensors, 10/1407

smoke detectors, 16/2327

Alarms, auto
 security sensors for, 10/1407

Alarms, burglar
 built into intercom system, 10/1465

for car, 1/75

for car tape player, 1/78

Cyclops, 1/80

electronic, 1/80

motion detector, 1/72

perimeter system, 1/73

selecting, 1/70

Alarms, fire
 built into intercom system, 10/1465

Alcohol, rubbing
 in cleaning cassette player, 4/507

in cleaning tape player, 4/511

Alcohol, wood
 in finishing wood-turnings, 11/1558

in furniture refinishing, 7/1057

for shellac removal, 8/1206

Algae, as swimming pool hazard,
 18/2628

Aliphatic resin glue, 1/39; 5/762

Alkaline battery, 2/220

Alkalinity
 of soil, 11/1575

of swimming pool water, 18/2629

Allen wrench, in faucet repair,
 7/1029, 1033; 9/1302

Allergies
 to insect stings, 13/1934

medication for, on camping trip,
 8/1089

Alligatoring, of paint, 11/1630;
 12/1827

- All-weather tent, 18/2704
- Alternating current
 - in auto, 1/85
 - circuit, 6/923
- Alternator, auto: *See* Auto alternator
- Aluminum
 - back-pack frame, 9/1363
 - for boat, 3/321
 - camper trailer construction, 3/403
 - canoe, 3/457
 - cementing, 2/171
 - edging strips, 3/406
 - flashing, 6/836
 - griddle in electric stove, 7/932
 - house siding, 16/2426
 - ladders, 10/1519
 - paint for roofing, 12/1840
 - poles, in entertainment center, 8/1173
 - as roofing material, 15/2181
 - screening for patio, 3/353
 - screens and storm windows, 1/90
 - for shaving bar, 2/171
 - shower door, mounting, 7/979
 - siding for dormer, 6/836
 - stripping, for roof repair, 15/2188
 - ventilator for gable, 6/834
 - in window rebuilding, 21/3104
- Aluminum boat
 - maintaining, 1/102
- Aluminum foil
 - camp cooking with, 12/1792, 1798
 - insulation, 9/1385
 - as vapor barrier, 15/2270
- Aluminum oxide
 - as abrasive, 1/25; 16/2346
- sandpaper, 15/2260
- Aluminum tubing
 - for directional microphone, 11/1659
 - for jogging machine, 7/1015
 - for rowing machine, 7/1020
 - in ultralight aircraft construction, 1/68
- Alyssum, 8/1132; 9/1255
- American Association of Nurserymen, 10/1539
- American Boat and Yacht Council, 3/322
- American Bonsai Society, 3/334
- American National Standards Institute, 3/402; 10/1519; 11/1680
- American Red Cross
 - First Aid Manual*, 8/1089
 - water safety rules, 15/2248
- American Water Ski Association, 20/3038, 3053
- Ammeter
 - DC, to test auto electrical system, 7/967
 - defined, 6/922
 - induction, in testing auto starter, 7/991
 - in testing auto alternator, 1/88
 - in testing battery, 2/215
 - in testing percolator, 5/625
- Ammonia
 - in fertilizer, 7/1049
 - in wax-stripping, 8/1113
- Ammunition
 - hand loading, 14/2132; 16/2379
 - making, 16/2381
 - reloading, 14/2128
- Amperage
 - of electric drill, 9/1301
 - of fuses, 6/912
 - maximum, 6/926
 - of microwave ovens, 7/944
- Ampere, defined, 6/922, 926
- Ampere-hours of battery capacity, 2/214, 217
- Ampere rating of fuses, 4/584
- Amplifier
 - audio, in tape recorder, 18/2657
 - Class A, 21/3088
 - for directional microphone, 11/1663
 - hi-fi servicing, 9/1361
 - low noise, for TV signals, 1/111
 - for parabolic microphone, 11/1666
 - in public address system, 14/2079
 - for security sensors, 10/1410
 - in stereo equipment, 17/2497, 2498
 - for stereo speaker system, 17/2476
- Amplitude modulation, marine radiotelephone, 7/960
- Analyzer
 - electronic, 7/966
 - exhaust, 7/1006
 - fuel pump, 8/1147
- Anchoring
 - boat as duck blind, 6/891
 - provision for, 3/322
- Anchoring compound, for mounting fixtures, 5/665
- Anemometer, building, 21/3087
- Angle of roof, determining, 6/833
- Angle valve, 7/1030
 - in plumbing, 14/2025
- Aniline dyes
 - to blend tones in wood, 11/1604
 - in furniture refinishing, 7/1060
 - in wood finishing, 7/1068
- Animal bites
 - emergency treatment for, 8/1087
- Animal intruders
 - guide to, 20/3077
- Animal tracks
 - making casts of, 20/2085
 - recognizing, 20/3083
- Animal wastes
 - recycling, 12/1748
- Antenna
 - coils, television, 18/2700
 - dish-shaped, 1/110
 - marine type, for radiotelephone, 7/962
 - roof-top, 1/104
 - satellite, 1/110
 - walkie-talkie, 20/2981
- Antifouling paint, 11/1628
- Antifreeze, auto
 - addition of, 5/687
 - winter protection map, 5/686
 - year-round use of, 7/1004
- Antihistamines, avoid when driving, 8/1089
- Anti-pollution devices, auto, 1/46, 116; 4/474
- Antiques
 - making from scrap lumber, 11/1602
 - refinishing, 7/1057; 8/1200
 - repair of, 3/390
- Antique
 - furniture, 1/123; 3/375, 382; 5/749, 762; 6/893; 15/2194
 - metal, 4/594
 - picture frames, 13/2007
 - scrap lumber, 11/1602
- Anti-sway device, for trailer, 19/2810
- Anti-venom, against snakebite, 16/2451
- Appliance repair: *See* Appliances, electric; Repair
- Appliances, electric
 - in auto, 6/911
 - blender, 2/276
 - clothes dryer, 20/3028
 - coffee maker, 5/630
 - dishwasher, 6/791
 - irons, steam or dry, 10/1471
 - mixers, 11/1671
 - in new home planning, 10/1403
 - power tools, choosing, 14/2052
 - range, kitchen, 7/931
 - razor, 16/2358
 - refrigerator, 14/2121
 - storage of, in hutch, 17/2537
 - toaster, 18/2733
 - trash compactor, 19/2853
 - trouble-shooting, 1/126
 - vacuum cleaner, 20/2933
 - washing machine, 20/3018
 - water heater, 9/1340
- Appliances, kitchen
 - arranging, 10/1489
 - noise of, 10/1484
- Applications software, 5/653
- Aquarium, sealing with silicone rubber compound, 4/516
- Architect's drawings, as aid in landscaping plan, 10/1537
- Archway gate, as new front for home, 9/1373
- Archway grille, building, 5/670
- Arc of visibility, for boat running lights, 12/1712
- Arkansas stone for whetting, 4/500; 10/1505; 16/2343, 2346
- Armature
 - in auto starter, 7/993
 - in blender motor, 2/278
 - winding, in electric mixer, 11/1675
- Artificial abrasives, 1/25
- Asbestos
 - of gaskets, 7/983
 - shingles, 9/1390; 15/2176
 - tile, as fireplace base, 7/1081
- Asbestos cement, 4/559
- ceiling tiles, 4/522
- house siding, 16/2426
- Ashlar pattern, for ceiling tile, 4/524
- Aspect ratio, of auto tires, 18/2728
- Asphalt
 - aluminum, paint for roofing, 12/1840
 - driveways, patching, 6/875
 - as house siding, 16/2426
 - for roofing, 15/2176
 - shingles, 9/1390
 - tile, for new home, 10/1405
- Asphalt-saturated fiber, as sheathing, 6/834; 9/1387
- Association of Home Appliance Manufacturers (AHAM) 1/55, 56
- Aster, 9/1255
- Atlantic salmon, identifying, 8/1105
- Atmospheric conditions, hampering laser beam voice transmission, 10/1546
- Attic
 - fan, for summer cooling, 5/682; 10/1406
 - remodeling, 1/32
 - usable, in new home building, 10/1400
- Audio frequencies, 7/952
- Audio signal, television, 18/2673
- Auger
 - drill bit, 6/858
 - motor-driven, 6/848
 - plumbing, 9/1250; 14/2019
 - sharpening, 16/2356
 - storage of, 9/1302
- Auto
 - accessories: *See* Auto accessories
 - air-fuel mixture, 4/470, 479, 577; 9/1347; 12/1745
 - alternating current in, 1/85
 - alternator: *See* Auto alternator
 - automatic transmission, 4/474, 615; 7/990; 12/1744; 14/2149; 19/2847
 - ball joints, repairing, 2/161
 - batteries: *See* Auto batteries
 - bearings, connecting rod, in oil loss, 12/1746
 - brakes: *See* Brakes, auto
 - carburetor: *See* Auto carburetor
 - choke: *See* Auto choke
 - condenser, 10/1433
 - controls, electric, servicing, 6/911, 915
 - cooling system, 5/684; 7/1000
 - crankcase: *See* Auto crankcase
 - crankshaft, 2/230
 - cylinder head gasket replacement, 5/691; 9/1326
 - dashboard gauges, checking, 6/915
 - direct current in, 1/85
 - electronics, 1/153
 - engine: *See* Auto engine; *see also* other entries under Auto
 - exhaust gas recirculation (EGR) system, 1/121, 155; 20/2941
 - fan belt, 1/86
 - filters: *See* Auto filters

- front-wheel drive, maintenance of, 1/148
- fuel gauge, 6/916
- gas consumption, 1/157; 4/469
- gaskets, 4/516; 7/982
- generator: *See* Auto generator
- hydraulic brake system, 6/887; 10/1430
- idle system, 4/470
- ignition points, installing in tune-up, 19/2906
- ignition system: *See* Auto ignition system
- microprocessor, 1/155
- lights: *See* Auto lights
- manual choke, 4/577
- noise, tracking down, 14/2142
- painting, 12/1819
- pollution control systems, 1/116, 155; 4/474
- power brakes, 6/887
- power steering, 14/2048
- rotor, 10/1433; 19/2904
- stereo for, 17/2501
- thermostatic air cleaner, servicing, 1/46
- tires: *See* Auto tires
- and trailer towing, 3/402
- Wankel engine, 19/2919
- wheel bearings, servicing, 2/225
- wheel cylinders, 10/1432
- wheels, balancing, 18/2730
- windshield, sealing, 4/516
- Auto accessories**
- air conditioning fuses, 6/913
- antifreeze: *See* Antifreeze, auto
- burglar alarms, 1/75
- car-top racks, 3/463; 4/484; 10/1529; 16/2442
- cigarette lighter, 6/913
- horn switch, 6/919
- jack, hydraulic, 2/232; 7/1001, 1051
- security sensors, 10/1407
- tape player, burglar alarm for, 1/78
- tape player, repairing, 4/510
- Auto alternator**
- maintaining output of, 1/85
- for recharging battery, 2/212
- Auto batteries**
- additives for, 2/216
- cables and hose, replacing, 13/1913
- in ignition system, 10/1433
- longer life for, 1/85
- maintenance, 2/211
- Auto body**
- dents and rust-outs, repairing, 14/2151
- dents, repairing while painting, 12/1820
- hydraulic jack for, 2/232; 7/1001, 1051
- upholstery, maintenance of, 19/2928
- Auto carburetor**
- adjusting, 7/1005
- bearings, 4/472
- care of, 7/1000
- choke, servicing, 4/577
- climatic control circuit, 4/483
- dashpot, 4/483
- float bowl, 4/477
- four-barrel, rebuilding, 4/476
- fuel leak in gasket, 4/478
- idle system, 4/470, 474; 7/1006
- maintenance of, 4/469
- for mini rotary engine, 15/2196
- replacing, 13/1903
- solenoid, 1/116
- top, cleaning, 7/1002
- Wankel engine, tuning up, 19/2919
- Auto choke**
- assembly, 4/473
- automatic cleaner, 4/475
- servicing automatic, 4/577
- Auto crankcase**
- excessive pressure causing oil loss, 12/1744
- oil, 4/580; 5/691; 7/997
- Auto engine**
- advances in, 1/157
- analyzer, 7/967
- care of, 7/1000
- changing bearings, 2/230
- changing parts, 13/1903
- clutch, 4/615
- clutch bearings, 4/620
- flooding, 4/483
- fuel gauge, 6/916
- fuel pump, 8/1147; 12/1744; 13/1906
- heat riser, 9/1347
- intake manifold, 4/471; 483, 578
- manifold, 7/985; 12/1793
- oil, additives for, 2/230
- oil, changing, 7/1003
- oil, dirty, 12/1745
- oil, heavy, 7/989
- oil loss, stopping, 12/1743
- piston, 1/157
- racing, 4/474
- rebuilt parts, 13/1903
- reciprocating vs. rotary, 15/2196
- removal of, 13/1910
- replacing with rebuilt, 13/1909
- review of operation, 7/995
- shock absorbers, replacing, 16/2375
- spark plugs, trouble-shooting, 16/2461
- stalling, 4/483
- starter, reviving, 7/989
- tappets, servicing, 7/994
- testing equipment, 7/966
- tuning, 4/469; 6/890; 19/2902
- vacuum in brake system, 6/887
- vacuum gauge in testing, 4/474; 7/1003; 13/1905; 20/2937
- valve and ring job, 20/2943
- valves, adjustment of, 7/1007; 20/2953
- Wankel rotary, 19/2919
- Auto filters**
- air, 7/1051; 19/2918
- fuel, 7/1051; 8/1147
- oil, lubricating, 7/1052
- Auto generator**
- electrical connections and, 6/913
- end plate, cleaning, 7/1002
- Auto ignition system**
- advance tester, 7/967
- care of, 7/1000
- checking, 7/1007
- coil winding, 10/1433
- electronic, 10/1434
- operation of, 10/1433
- testing, 4/469
- timing, 13/1905
- Auto lights**
- back-up, 6/913
- directional, 6/913
- Automatic gain control (AGC)**, television, 18/2673, 2679, 2695
- Automatic transmission**, 4/474, 615; 7/990
- oil filter replacement, 19/2847
- oil for, 19/2852
- servicing, 19/2847
- tracking noise in, 14/2149
- with vacuum modulator, 12/1744
- Auto tires**
- buying and maintaining, 18/2725
- rotating, 18/2731
- Awls, types of, 9/1317
- Awnings**
- for camping trailer, 3/402
- for mobile home, 11/1690
- translucent, 13/1881
- vented for summer cooling, 5/682
- Axe**
- choosing and maintaining, 10/1502
- sharpening, 16/2341, 2346, 2353; 18/2766
- B**
- Babbitt alloy, in bearings, 2/231
- Backing piece, lathe, 11/1558
- Back pack**
- all-purpose, making, 9/1363
- for canoeing, 3/459
- frame, making, 9/1363
- oven for, 12/1798
- packing, 9/1370
- Back packer**
- check list for, 3/419
- tents, maintenance of, 3/444
- Back packing**
- emergency shelter in, 17/2609
- photography in, 13/1951
- and quicksand, 14/2084
- tent for, making, 18/2707
- Back sprain**, emergency treatment for, 8/1090
- Backstroke**, in swimming, 17/2615
- Back-up lights**, auto, 6/913
- Backyard**
- barbecue, 2/164
- camping in, 3/414
- Bacteria, as swimming-pool hazard, 18/2628
- Baffle**
- for bookshelf stereo speakers, 17/2509
- for outdoor hi-fi speaker, 17/2519
- Bag**, camera, 4/438
- Baitfish**, movement of, in trolling, 19/2885
- Bakelite dial**, in antique radio, 14/2107
- Baker tent**, for camping, 3/426
- Baking soda, for cleaning coffee makers, 5/623
- Balance**, in boat handling, 6/807
- Balance system**, garage-door, 8/1218, 1223
- Ballast**, in fluorescent light, 8/1135
- Ballast control unit**, 6/923
- Ballast resistor**, in auto ignition systems, 10/1435
- Ball bearings**
- in electric drill, 6/857
- for jogging machine, 7/1014
- in lathe, 11/1547
- Ball joints**, auto, repairing, 2/161
- Balsa**
- in boat construction, 3/321
- for decoy, 5/754
- Banding wheel**, 4/531
- Bandpass filter**, 7/959
- Bandsaw**, in woodworking, 4/491, 553; 8/1160, 1183, 1208; 9/1366; 16/2450; 19/2860; 21/3139
- Banjo wall clock**, 4/594
- Barbecue**, back yard, 2/164
- Bar cabinet**, in free-standing storage wall, 17/2572
- Bare-root planting**, in winter, 9/1242
- Bar groove**, of chain saw, 11/1638
- Barn**, shed-type, 9/1280
- Barn beams**, 11/1600
- Barometer**
- as camping necessity, 3/428
- movement, in weather forecasting, 20/3059
- Bars**, refreshment
- buffet and wine cellar, 21/3114
- plastic laminates for, 10/1496
- of prefinished panels, 2/166
- rustic pine, 2/175
- Baseboard**
- cove molding for, 8/1122
- in installing wall paneling, 13/1860
- Basement**
- care of, 2/180
- clothes dryer installed in, 20/3029
- damp, 2/180
- finished, 2/180
- flooding, 6/847
- full, in new home, 10/1399
- importance of, in new home, 10/1406
- insulation of, 2/186
- laundry area in, 11/1565
- remodeling, 1/32
- site for workshop, 21/3199
- waterproofing, 2/180
- window screens for, 1/96
- Base station**, citizen's band radio, 4/590

- BASIC**, computer language, 5/653
- Basin**, water, for garden, 9/1249
- Basket-weave fence**, 9/1372
- Bass**
fishing, 2/189
identifying, 8/1100
- Bathroom**
adding, 9/1377
in adding a second story, 15/2164
back-to-back in new home construction, 10/1403
caulking of bathtub, 4/514
ceramic tiling for, 2/194
clogged drains, 6/844
enclosed bathtub, 2/208; 7/979
floor tile, 2/202
grouting between tiles, 2/201, 203
laundry area in, 12/1563
plasterboard panels for, 20/2992
plastic walls for, 2/204; 10/1403
in remodeling attic, 1/35
shaving bar in, 2/171
tile accessories, 2/198
valves, plumbing, 14/2018
ventilation by fan, 20/2965
wall tile, 2/199
- Batter boards**
in building retaining wall, 17/2527
in laying out patio floor, 3/356
- Batteries**
additives for, 2/216
auto, 10/1433, *see also* Auto batteries
boat, 2/217, 311; 7/963; 11/1632
cables and hose, replacing, 13/1913
carbon-zinc, 2/222
care of, 3/438; 7/1012
in cassette player repair, 4/506
checking for spring, 11/1632
extra, for camping trips, 3/435
how to buy, 2/213
for intercom systems, 10/1465
for optical communication, 5/651
outboard motor, checking, 12/1772
for photomicrography, 13/1994
for radiotelephone, 7/963
recharging, 2/212
small, 2/219
tape recorder, checking, 18/2657
in transistor radios, 9/1362
in walkie-talkie repair, 20/2980
- Battery acid stain**, removal of, 19/2931
- Bayonet saw**, in woodworking, 4/491; 8/1160
- BB gun**, learning to operate, 16/2409
- Bead cut**, in wood turning, 11/1554
- Beading cutter**
for electric drill, 6/861
for routing, 6/895
- Beam collimating optics**, to extend laser voice system, 10/1542
- Beans**
green or wax, for first vegetable garden, 9/1242
- Bearings**
auto wheel, 2/225
bicycle, 2/261
carburetor, 4/472
clutch, 4/620
compass, 12/1729
connecting rod, in oil loss, 12/1746
in electric drill, 6/857
engine, changing, 2/230
for jogging machine, 7/1014
in lathe, 11/1547
replacement, 2/232
wheel, servicing, 2/225
- Bears**, as camp intruders, 20/3077
- Beater gears**, in electric mixer, 11/1671
- Beater unit**, of loom, 11/1591
- Beaufort Scale of Wind**, 20/3063
- Bed posts**, turning on lathe, 6/906
- Bedroll**
in back pack, 9/1364
how to lash, 3/440
- Bedroom**
adding, 9/1377
in adding a second story, 15/2164
- Beds**
bunk, 2/235
canvas cot for camping, 3/417
Colonial canopy, 6/906
folding, storage unit for, 17/2531
race car, 2/240
wallbed unit, 2/244
- Beer**, as trap for slugs, 9/1240
- Belted bias-ply auto tires**, 18/2726
- Belt sander**, 1/30; 8/1213
choosing, 14/2054
on electric drill, 6/856
for resurfacing siding boards, 16/2436
- Belt system**, washing machine, 20/3033
- Bench**
built-in, for patio, 5/728
concrete, 12/1764
deacon's, 5/725
for sauna bath, 15/2270
telephone, 5/725
- Bench saw**, in woodworking, 4/491
- Bench stones**, for "all-purpose" sharpening, 16/2347
- Bending**
acrylic sheet, 14/2009
lumber for boat bow, 14/2090
metal table legs, 8/1168
plywood, for sternwheeler, 12/1800
wood, 21/3139
- Bentgrass**, for lawn, 11/1574, 1580
- Bermuda grass**, for lawn, 11/1573, 1579
- Bevel bit**, 10/1499
- Beveling**
border in wood carving, 4/502
on chisels, 4/570
with circular saw, 18/2769
coffee-table top, 8/1168
with combination wood shaper, 19/2800
plywood edges, 4/484
with saber saw, 15/2235
sticking door, 6/829
with table saw, 18/2653
- Bias-ply auto tires**, 18/2726
- Bicycle**
choosing, 2/250
derailleurs of, 2/259
glossary of terms, 2/256
ten-speed, servicing, 2/259
- Big Bertha air cannon**, 15/2281
- Big Dipper**, in direction finding, 6/782
- Billiard cloth**, for pool table, 14/2038, 2046
- Binding**, of recorded tape, 18/2661
- Binocular microscope**, 13/1973
- Binoculars**, buying, 2/264
- Birch**
for breakfront china cabinet, 4/561
for child's footlocker, 8/1163
for Colonial hutch, 6/900
for cradle, 8/1160
for dowels, 6/387
for drop-leaf coffee table, 18/2634
for modern desk, 8/1183
plywood for bunk beds, 2/237
for TV cabinet-bookcase, 3/348
- Birdbath**
concrete, 12/1763
pedestal-type, 3/369
- Bird feeders**
building, 2/270
circular, 2/274
- Birds**, in insect control, 12/1755
- Bites**, insect, 13/1931
- Bit-key lock**, 11/1586
- Bits**
auger, 6/858
beading, 6/897
bevel, 10/1499
carbide-tipped for masonry, 3/355; 13/1881; 14/2056
extension, 4/586
- flush**, 10/1499
- mounting on radial arm saw**, 14/2099
- multi-spur**, 19/2792
for power tools, 14/2056
router, 6/897; 10/1499
screwdriver, 6/860
side-cutting, for electric drill, 6/859
types of, 6/856
- Blades**
carbide-tipped, for table saw, 18/2655
care of, 15/2236
knife, 10/1503
saber saw, 14/2058; 15/2227
types for power saws, 18/2769
- Blank (crystal plate)**, 7/955
- Bleaches**, for wood refinishing, 7/1057
- Bleeding heart**, 8/1132
- Bleeding of drum brake system**, 6/886
- Blender**, repairing, 2/276
- Blind doweling**, 6/838
- Blind**, in waterfowl hunting, 6/891; 10/1423, 1426
- Blinker**, for identifying house, 7/973
- Blood stain**, removal of, 19/2931
- Blood-type bracelet**, 8/1090
- Blower control**, of gas furnace, checking, 9/1339
- Blowtorch**, to remove old paint, 12/1813
- Blue catfish**, identifying, 8/1105
- Bluegill**, identifying, 8/1103
- Blue grama grass**, for lawn, 11/1579
- Blueprints**, language of, 1/147
- Board**
fence, 7/1039
foot, 11/1599
- Board**, insulation, 9/1329
for new home, 10/1405
- Boat**
abandoning in emergency, 7/978
aluminum, maintenance of, 1/102
battery for, 2/217
building: *See* Boat building
canoe, 3/457, 463; 12/1777
check list for spring fit-out, 11/1631
duck, camouflaging, 6/891
engine: *See* Boat engine
fiberglass, storage of, 17/2562
fuel supply, 7/976
hull, reconditioning, 11/1627
inspecting before purchase, 3/321
inspecting sailboat, 11/1632
load capacity, 3/330
loading onto trailer, 3/327
maintenance of, 17/2559
outboard: *See* Outboard boat
outboard motor for: *see* Outboard motors
painting, 11/1627
pleasure, 10/1418
power, light requirements for, 12/1712
powerplant rating, 3/330
preparing for storage, 17/2559
propeller torque, 3/315
removing paint from, 16/2460
runabout: *See* Runabout boats
storage port for, 17/2553
suspension storage of, 17/2562
testing, 3/329, 333
twin-screw, 3/315
venting regulations, 11/1634
- Boat building**
adhesives in, 2/287
aluminum, 3/321
balsa wood in, 3/321
battery, 2/217
Buck Board, 2/294
Deep-vee Sea Angler, 2/306
engine, 2/311
exterior or marine grade plywood for, 11/1601
fiberglass, 3/321
hull, choosing type of, 10/1417
hunting and fishing skiff, 16/2442

- ignition system 2/311
- lumber for, 2/281
- mini-hydrofoil, 14/2086
- paddleboard, 2/308
- panels, side and bottom, 2/290
- planking, 2/284
- plywood, 2/287
- pram, 15/2221; 19/2837
- Pogo sternwheeler, 12/1800
- runabouts, 3/303; 15/2210, 2218, 2221
- sailing dinghy, 15/2218
- Sea Angler, 2/306
- sealing seams with caulking gun, 4/513
- selecting wood for, 2/281
- surfboard, motorized, 15/2210
- training boat, 19/2837
- welded aluminum construction, 3/321
- Boat camper, check list for, 3/422
- Boat engine
 - breaker points, 2/313
 - checking for spring, 11/1632
 - fuel system, 3/322; 17/2560
 - ignition system, 2/311
 - torque, 3/332
- Boat equipment
 - anchor, 3/322
 - bottom drain, 3/331
 - canoe, car-topping rig for, 3/463
 - citizen's band radio, 4/589
 - deck hardware, 3/322
 - directional microphone for, 11/1658
 - electrical, 3/322
 - fuel tank and lines, 3/322
 - radio, static in, 7/960
 - running lights, requirements for, 12/1711
 - speedometer, 3/333
 - spray rails, 3/332
 - tent, making, 18/2707
 - trailer: *See* Boat trailer
 - windshield, 3/322
- Boat handling, 3/315
- Boating
 - accidents, 15/2238
 - acquiring seamanship, 3/320
 - compass, steering by, 12/1722
 - developing skills for large boat, 3/315
 - distress signals, 7/977
 - docking, techniques of, 6/806
 - drown-proof, making yourself, 17/2610
 - effect of windage in, 3/318
 - emergency repairs while afloat, 7/974
 - folk navigation, 12/1730
 - launching from trailer, 3/323
 - makeshift repairs, 7/978
 - and quicksand, 14/2085
 - "rules of the road," 12/1711
 - safety equipment for, 3/327
 - sailing for beginners, 15/2254
 - steering by compass, 12/1722
 - steering characteristics of large boat, 3/315
 - testing maneuvers, 3/331
 - warning display signals, 15/2241
 - weather forecasting for, 20/3057
- Boat trailer
 - buying, 19/2814
 - hitch for, 19/2809
 - launching from, 3/323
 - lights for, 19/2827
 - maintenance of, 19/2821
 - nose wheel for, 3/328
 - tire size, 19/2814
 - wheel bearings, greasing, 19/2811
- Boiler type, of electric steam iron, 10/1474
- Bolt-on hitch, for trailer, 19/2809
- Bolts, how to tighten precisely, 9/1324
- Bonsai Clubs International, 3/334
- Bonsai dwarf trees, 3/334
- Bookcase
 - bookshelf-table, 3/339
 - on casters, 3/344
 - in corner desk set, 5/774
 - lectern, 3/344
 - in remodeling, 1/34, 137
 - shutters for, 16/2422
 - TV cabinet, 3/348
 - for wallbed unit, 2/247
- Bookends, carving, 4/497
- Bookshelf, in bed storage unit, 17/2531
- Bookshelf-table, building, 3/339
- Bookshelves, ready-made, for stereo speakers, 17/2505
- Bores
 - inlaid wood, 10/1458
 - for inlays, 3/392
- Boring, with radial arm saw, 14/2099
- Boron carbide, as abrasive, 16/2346
- Bottles
 - converting into useful objects, 3/351
 - removing top or bottom, 9/1293
- Botulism, 8/1090
- Bowie knife, 10/1503
- Bowls, of inlaid wood turnings, 10/1452
- Box
 - construction for sleeping bag, 3/450
 - decorative, making, 19/2796
 - of inlaid wood turnings, 10/1452
 - how to line, 5/750
 - wood, 10/1414, 1452; 19/2796
- Box-end wrench, 16/2377
- in boat tool kit, 7/974
- Brakes
 - bicycle, 2/250, 263
 - for boat trailer, 19/2819
 - caliper, for bicycle, 2/252
 - minibike, 11/1670
 - for land-sailer, 10/1531
- Brakes, auto
 - disc, servicing, 2/229; 6/786
 - drum, servicing, 6/787, 876
 - emergency, 6/787
 - hydraulic, 10/1430
 - power, 6/887
 - replacing, 13/1913
- Brake shoes, 6/788
- Brass
 - antique, 3/394
 - shell case, annealing, 16/2384
- Breakaway switch, for trailer, 19/2810
- Breaker points, in boat engine, 2/313
- Breakfront china cabinet, 4/561
- Breaststroke, 17/2618
- modified, in swimming underwater, 17/2624
- Breathing, in swimming, 17/2615
- Breathing port, in hydraulic brakes, 10/1431
- Breezeway
 - enclosing, 9/1374
 - screening, 3/353
- Bric-a-brac, cabinet for, 3/384
- Bricks
 - as base of room divider, 15/2192
 - building with, 3/360
 - chimney, pointing, 4/559
 - for fences, 7/1037
 - as fireplace base, 7/1081
 - as house siding, 16/2427
 - for kitchen wall, 20/3007
 - laying, 3/360; 5/657
 - materials for bonding with, 5/662
 - polyester, 8/1114
- Brickwork, 3/360
- repairing, 5/664
- Brightener, picture tube, 18/2674
- British thermal unit (BTU), 1/51; 8/1152; 10/1406
- Broadcasting, satellite, 1/110
- Bromine, as swimming-pool disinfectant, 18/2629
- Brook trout, identifying, 8/1104
- Brushes
 - in auto starter, 7/990
 - wire bristle, 4/559; 7/1002; 8/1146; 11/1656; 18/2766
- Buck Board boat, 2/294
- Buck saw, folding, for camping, 10/1510
- Buffalo grass, for lawn, 11/1579
- Buffet and wine cellar, building, 21/3114
- Building
 - A-frame playhouse, 14/2016
 - block screens and partitions, 5/667
 - boats: *See* Boat building
 - campfire, 3/408
 - with concrete, 5/658
 - contractor, working with, 10/1404
 - dormer, 6/831
 - furniture: *See* listings under Furniture
 - home, 10/1398
 - laundry center, modular, 11/1567
 - materials, for adding to home, 9/1378
 - screened patio or breezeway, 3/353
 - wishing well, 12/1759
- Built-ins
 - dishwasher, placement of, 10/1491
 - drawers in, 6/852
 - in garage conversion, 8/1230
 - intercom systems, 10/1469
 - oven, placement of, 10/1492
 - wallbed unit, 2/244
- Built-up covering, for flat roof, 15/2182
- Bulbs
 - leave foliage until yellow, 9/1240
 - planting in fall, 9/1245
 - spring-flowering, choosing and planting, 8/1126
 - winter storage of, 9/1246
- Bullets
 - casting lead, 14/2132
 - in reloading ammunition, 14/2128
 - Bullnose trim tile, 4/543, 546
 - Bumper pool table, 14/2042
 - Buna-N adhesive, 1/40
 - Bunk beds: *See* Beds
 - Burdened vessel, and right-of-way, 12/1713
 - Burglar alarms: *See* Alarms, burglar
 - Burlap, for wall decorations, 5/701
 - 21/3205
 - Burns, emergency treatment, 8/1090
 - Bushings
 - bypass, in carburetor, 4/479
 - caliper float, 6/790
 - for electric cable, 21/3129
 - water pipe, 4/548
 - Butt chisel, 4/571
 - Butt joint, 2/309; 3/339
 - Buttermilk paint, 8/1206
 - Butyl rubber caulking compound, 4/514
 - Buying
 - air conditioners, 1/51
 - automobile tires, 18/2725
 - batteries, 2/213
 - bicycle, 2/250
 - binoculars, 2/264
 - boat, 3/321, 329
 - boat-launching trailer, 3/323
 - burglar alarms, 1/70
 - cabinetmaker's supplies, 3/390
 - campers, 3/396
 - canoes, 3/457
 - electrical appliances, 10/1403
 - electric light dimmer, 6/777
 - grass seed, 11/1579
 - intercom system, home, 10/1464
 - knives and axes, 10/1502
 - ladders, 10/1521
 - lath, 11/1596
 - lumber, 11/1595
 - minibike, 11/1652
 - mobile home, 11/1677, 1685
 - moldings, 11/1599
 - nails, 12/1707
 - outboard motor, 12/1770
 - outboard motor for boat, 12/1771
 - plywood, 11/1600
 - shingles, 11/1596
 - used furniture, 8/1199

Buzzy Bee surfboard, 15/2210
 Buzz control, in television, 18/2685
 Byte, computer memory, 5/654

C

Cabinet combination saw blade, 19/2784
 Cabinetmaker's supplies, 3/390
 Cabinets
 antiqued, of scrap wood, 11/1602
 boat interior, checking, 3/322
 breakcase, TV, 3/348
 breakfront, 4/561
 brick-a-brac, 3/384
 Colonial hutch, 6/900
 console with mirror, 3/376
 corner, 3/384; 5/771
 crown moldings for, 3/376; 12/1705
 doors in, 6/849
 drawers in, 6/849; 10/1411
 dry sink as, 6/893
 in entertainment center, 8/1170
 in fence storage shed, 7/1043
 filing, 6/853
 for fold-away table, 18/2641
 gun and ammunition, 6/801
 high-fidelity speaker, 8/1173
 kneehole, in workbench, 21/3186
 modular laundry center, 11/1568
 plastic laminates for, 10/1496
 ready-made, 10/1403
 record, 11/1606
 in room divider, 17/2544
 for sea-shell collection, 16/2364
 sewing, 8/1174
 for sports gear, 17/2564
 storage in boat port, 17/2558
 tool, in workbench, 21/3182
 utility, 11/1571
 wall, 3/370
 workshop, 6/854
 Cabinet scraper
 burnishing, 16/2346, 2354
 in furniture refinishing, 7/1060
 to level inlaid picture, 10/1450
 in wood finishing, 7/1062; 9/1308
 Cabinetwork
 lumber for, 11/1595
 use of dowels in, 6/837
 Cable
 for appliance circuit, 4/586
 armored, 14/2138
 bicycle shift, 2/259
 BX, 21/3121, 3129
 coaxial, satellite antenna, 1/113
 electric, 6/925
 garage-door system, 8/1222
 handing, 21/3129
 nonmetallic, 21/3131
 running, for intercom, 10/1466
 Cacodylic acid, 11/1574
 Cacti, 8/1143
 Cage roller, for paint, 12/1811
 Calcimine, removing, 16/2460
 Calcium, in water, 6/791
 Calcium carbonate deposits, 11/1654
 Calcium nitrate, 11/1575
 Calibration
 of anemometer meter, 21/3098
 of electric range controls, 7/938
 of oven temperature, 7/936
 Caliper
 brakes, 2/252
 disc brakes, 6/786
 for use with lathe, 11/1549
 on wheel bearing, 2/229
 Calliopsis, 9/1256
 Callsign, CB radio, 4/589
 Calorie intake, in maintaining body warmth, 17/2605
 Camera
 adjustable, 13/1937
 bellows-type, 13/1978
 on camping trips, 3/432; 13/1950
 care for, on camping trip, 3/436
 cartridge-loading, 13/1950
 cleaning fluid for lens, 3/347

close-up lens, 3/434
 electric eye, 3/436
 home video, 20/2977
 in infant photography, 13/1970
 lens opening, 13/1937
 for macrophotography, 11/1620
 movie, 13/1956
 for photographing television scenes, 13/1955
 for photomicrography, 13/1975
 shutter speed, 13/1937, 1956
 single lens reflex, 13/1984
 in strob photography, 17/2594
 support bracket for, 13/1986
 telephoto lens, 13/1949
 underwater, 16/2325
 wide-angle lens, 13/1950
 Camper
 check list for, 3/420
 buying, 3/396
 chassis-mounted, 3/401
 pickup, 19/2812
 portable shower for, 16/2416
 tailgate extension for, 3/406
 tips for towing, 19/2810
 truck, 3/396
 Campfire
 building in wet weather, 3/424
 and cooking in foil, 12/1794
 how to build, 3/408
 wood for, 3/408, 410
 Camping
 animal intruders, 20/3077
 with camera, 3/432
 on canoe trip, 3/462
 cooking convenience, 12/1780, 1792
 direction finders, 6/782
 drown-proof yourself, 17/2610
 equipment: See Camping equipment
 first aid in, 8/1088
 foul weather, 3/423
 frostbite protection, 17/2607
 how to get started, 3/414
 how to read weather signs, 3/428
 identifying wild flowers, 20/3073
 photography in, 3/432; 13/1949
 and quicksand, 14/2085
 in scuba-diving trips, 16/2326
 and snakebite treatment, 16/2449
 and wild foods, 12/1787
 windproof tent, 18/2706;
 winter, equipment for, 17/2604
 Camping equipment: See also
 Camper
 air mattresses, 3/416
 all-purpose back pack, 9/1365
 back pack packing, 9/1370
 bedroll, how to lash, 3/440
 cabinet for gear, 17/2564
 car-top luggage rack, 4/484
 check lists for, 3/418
 chuck box, 12/1780
 cooking rigs, improvised, 12/1784
 first aid kit, 8/1088
 foil as cookware, 12/1792
 flameless cooker, 12/1782
 knives and axes, 10/1502
 maintenance for gear, 3/443
 quick-light lantern, 3/442
 sleeping bag, 3/447
 tent, Baker, 3/426
 tent, how to lash, 3/440
 tent, how to pitch, 18/2701
 tent making, 18/2707
 for winter, 17/2604
 Campsite
 choosing, 3/427
 shielding from wind, 17/2605
 Candles, making, 3/452
 Candytuft, 8/1132, 9/1256
 Can, gasoline, for improvised
 cooking rig, 12/1784
 Canoe
 car-topping rig for, 3/467
 how to buy, 3/457
 how to travel by, 3/457
 motorizing, 12/1777
 portage, how to, 3/461
 portage rig for, 3/463

Canvas
 for canoes, 3/457
 pack sack, 9/1363
 tent, repairing, 18/2710
 Cap, chimney, 7/1075
 Capacitance, external, 7/957
 Capacitive reactance, 7/954
 Capacitor
 anemometer, 21/3088
 coaxial, 7/964
 electrolytic, 9/1359
 electronic, 7/948, 952
 filter, in TV repair, 18/2691
 stereo speakers, 17/2509
 Capstan drive
 in cassette player, 4/507
 in cleaning tape player, 4/511
 Car: See also Auto
 model, hideaway track, 11/1694
 Carbide scraper, 12/1813
 Carbide-tipped saw blades, 19/2784
 for cutting plastic, 10/1496
 Carbon tetrachloride
 for cleaning fabric upholstery, 19/2929
 Carburator
 automobile, rebuilding kit, 4/472; See also Auto
 carburetor
 boat, checking, 7/975
 outboard motor, adjustment of, 7/960; 12/1774
 Carpenter's level, 8/1226
 Carpenter's saw, 9/1299
 Carpet grass, for lawn, 11/1580
 Carpeting
 indoor-outdoor, 10/1405
 planning room dimensions, 10/1402
 removing spots from, 17/2484
 shag foam, 2/180
 wall-to-wall, 10/1398
 Carpet tile, installing, 18/2715
 Carport
 for mobile home, 11/1690
 wall used for storage, 10/1404
 Cart
 chef's, 4/487
 garden planter, 4/491
 wide-track gardening, 12/1754
 Car-top rack
 for canoe, 3/463
 for Land-sailer, 10/1529
 for luggage, 4/484
 for skiff, 16/2442
 Cartridge
 fuses in auto, 6/911
 filter, auto, 7/1052
 phonographic, 7/953
 Carving
 decorations in wood, 4/495
 duck decoys, 5/757
 high relief in wood, 4/501
 linoleum, 14/2050
 molded wood, 3/392
 rotary file for, 6/860
 with routing bit, 6/869
 Casein glue, 1/40; 13/1869
 Cassette
 in car stereo, 17/2501
 deck, types, 17/2499
 player, repairing, 4/506
 receiver, 17/2499
 Cassette recorders, video, 20/2974
 Casters
 corner bracket, 6/895
 for drop-leaf server, 16/2330
 mounting, 4/614
 for roll-about server, 16/2337
 screw-in wheels, 3/347
 Catfish, identifying, 8/1105
 Cat's paw knot, 10/1516
 Catwalk, for boat trailer, 3/326
 Caulking
 in ceramic tiling, 2/201
 chimney-wall siding joint, 4/558
 for darkroom light seal, 5/722
 doors before painting, 12/1833
 of fiberglass panels, 13/1884

- kitchen sink, 10/1500
- marine, 1/43
- seams in boat painting, 11/1627
- windows, 11/1657; 12/1833
- Caulking gun
 - for applying adhesive, 4/609
 - for applying wall panels, 2/188
 - for sealing house joints, 4/513
- CB radio: *See* Citizen's band radio
- Cedar
 - for building fram, 15/2223
 - for closets, 4/609
 - for fence storage shed, 7/1043
 - for house siding, 16/2427
 - for motorized surfboard, 15/2211
 - posts for wooden deck, 5/744
 - for sauna bath, 15/2270
- Ceilings
 - acoustical, 4/517, 521
 - in attic remodeling, 1/141
 - direct installation, 4/517
 - false beams for, 8/1238
 - gypsum paneling for, 20/2986
 - lighting fixtures, 10/1441
 - luminous, 10/1442
 - luminous fiberglass, 13/1890
 - patches, 13/1917
 - plywood squares, 13/1863
 - rack for storing lumber, 11/1612
 - sound-absorbent, 4/521; 10/1484
 - soundproof, 12/1735
 - suspended, 4/517, 522, 527
- Cellulose nitrate cement, 1/40
- for aluminum, 2/171
- asbestos, 4/559
- Cement
 - ceiling tile adhesive, 4/524
 - cellulose nitrate, 1/40
 - ceramic tile adhesive, 2/194; 4/543
 - contact, 1/40; 4/505; 5/725; 7/1017, 1026; 8/1173; 10/1497; 13/1893; 21/3151
 - elixir, 5/662; 21/3091
 - latex, 5/662
 - materials for bonding with, 5/662
 - model airplane, 1/40
 - plastic, premixed, 12/2597
 - Portland, 3/360; 9/1381
 - PVC, 11/1660
 - roofing, 6/836; 15/2183
 - stucco, premixed, 12/2597
 - types, 5/657
- Center finders, dowel, 6/838
- Center screw work, in wood-turning, 11/1557
- Central air conditioning, 1/52
- Ceramic mosaics, 18/2719
- Ceramics
 - adhesives for, 1/39; 2/194
 - thrown without wheel, 4/531
- Ceramic tile
 - caulking, 2/201
 - for fireplace, 7/1081; 18/2719
 - for kitchen counters, 4/537
- Chain
 - bicycle, 2/259, 262
 - painting, 2/275
- Chain saw
 - firewood cutting, 8/1085
 - how to use, 18/2773
 - maintenance of, 7/1010; 11/1636
 - rotary engine for, 15/2196
- Chairs
 - rebuilding, 8/1204
 - rocker, for patio, 8/1187
- Chaise
 - sun-sauna, 4/548
 - two-place, 4/553
- Chalking, of paint, 11/1630; 12/1827
- Channel catfish identifying, 8/1105
- Channel lock pliers, 7/1028
- Channels, CB radio, 4/589
- Charts
 - air conditioning types, 1/52
 - appliance wiring diagram symbols, 1/129
 - auto cooling system service diagnosis, 5/688
 - auto engine trouble-shooting, 7/1009
 - bicycle frame size, 2/253
 - bicycle gearing, 2/251
 - bicycle safety recommendations, 2/255
 - binocular purpose, 2/269
 - blender trouble chart, 2/280
 - blueprint language, 1/147
 - boating distress signals, 7/977
 - boat warning display signals, 15/2241
 - boxing the compass, 12/1723
 - brake problems, 6/882
 - bulbs, planting and blossoming times, 8/1128
 - calculating heat loss, 9/1333
 - candle making, 3/453, 455
 - candlewicks, 3/453
 - check lists for campers, 3/418
 - Class D CB channel, 4/592
 - clothes dryer trouble-shooting, 20/3034
 - clutch trouble-shooting, 4/621
 - color guide for house painting, 12/1835
 - combustion comparisons, 17/2585
 - concrete color guide, 5/660
 - cooling capacity in air conditioning, 1/56
 - degrees of taper in wood, 10/1416
 - dishwasher repair, 6/799
 - electric drill speeds, 6/862
 - electric range trouble-shooting, 7/941
 - electronic prefixes, 7/950
 - engine and underhood noises, tracking, 14/2143
 - evergreen trees, 19/2876
 - exterior house painting, 12/1834
 - faulty patterns in spray painting, 14/2160
 - fertilizers, types of, 11/1576
 - firewoods, characteristics, 8/1086
 - first aid kit, 8/1092
 - fluorescent light troubleshoooting, 8/1137
 - fluorescent tube, selection guide, 21/3135
 - gypsum panel nails, 20/2984
 - incandescent bulb selection guide, 21/3136
 - iron problems and causes, 10/1475
 - kitchen lighting guide, 10/1445
 - lights required on boats, 12/1719
 - lumber data, 6/836
 - maximum bends of fir plywood, 2/284
 - mixer, trouble-shooting, 11/1675
 - mobile home check list, 11/1686
 - nail sizes, 12/1709
 - outboard motor, trouble-shooting, 12/1774
 - paint failures, 12/1822
 - personal swimming safety, 15/2251
 - photographic exposure table, 13/1958
 - plants for insect control, 12/1758
 - plants that solve garden problems, 9/1273
 - plywood grades and uses, 11/1699
 - power tool safety check list, 14/2064
 - radial arm saw trouble-shooting, 14/2096
 - ratings of site exposures to railway noises, 12/1738
 - refrigerator trouble-shooting, 14/2127
 - safety at the beach, 15/2251
 - safety for ponds, 15/2253
 - safety for private pool, 15/2252
 - saw blade recommendations, 19/2787
 - sea shells, by region, 16/2362
 - shell case dimensions, 16/2383
 - soils, 9/1271
 - spot removal, 17/2484
 - spray gun, poor action of, 12/1825
 - stain removal, floor, 17/2486
 - strobe photography, 17/2593
 - swimming pool care tips, 18/2630
 - television trouble-shooting, 18/2675
 - tent repair supplies, 18/2714
 - three-way bulbs, sizes and uses for, 21/3135
 - toaster trouble-shooting, 18/2737
 - toolbox or workshop tools, 9/1322
 - tool sharpening tips, 16/2345
 - trash compactor trouble-shooting, 19/2859
 - 20 most popular herbs, 9/1352
 - ultralight aircraft, statistics of, 1/69
 - used furniture troubleshooting, 8/1202
 - vacuum cleaner troubleshooting, 20/2936
 - voltmeter test lights, 7/933
 - wall coverings, selecting, 13/1874
 - wallpaper requirements, 20/3001
 - washing machine trouble-shooting, 20/3027
 - weights of fir plywood, 2/284
 - wind/barometer, 20/3067
 - wind chill factor, 17/2605
 - wiring indicator lights, 21/3125
 - Chassis-mounted camper, 3/401
 - Chester cord, in television adjustment, 5/636; 18/2681
 - Checking, of paint, 11/1630; 12/1823, 1830
 - Check list
 - for auto camper, 3/420
 - for back packer, 3/419
 - for boat camper, 3/422
 - for boat's spring fit-out, 11/1631
 - for camping, 3/418
 - for recreational vehicle, 3/421
 - for travel trailer, 3/419; 19/2811
 - in washing machine trouble-shooting, 20/3026
 - Chef's cart, 4/487
 - Chemical Specialties
 - Manufacturers Association, 5/691
 - Chessboard table, 8/1211
 - Chewing gum, removal of, 19/2931
 - Children
 - beds for, 2/235, 240
 - cradle, 8/1160
 - flashing toys for, 5/706
 - footlocker, 8/1163
 - hideaway track for model cars, 11/1694
 - little red barn for, 9/1280
 - minibike, 11/1652
 - playhouse, A-frame, 14/2016
 - photographing, 13/1943, 1960, 1962, 1970
 - raft, 14/2113
 - Children's furniture: *See* Furniture
 - Chimes, installation of, 6/813, 824
 - Chimney
 - cleaning, 7/1074
 - flue, 7/1081
 - installation, 7/1081
 - maintenance of, 4/558
 - for wood stove, 17/2585
 - Chimney-wall siding seam, caulk against weather, 4/513
 - Chip carving, 4/495
 - Chipping, of paint, 12/1824
 - Chisels
 - carving, 4/495
 - how to use, 4/569
 - making, 4/499, 501
 - quality of, 9/1299
 - sharpening, 4/499, 501; 16/2343, 2346, 2352
 - skew, 4/495, 501
 - types of, 9/1313
 - vee, 4/497, 502
 - wood-turning, 11/1548
 - Chlorination, of water supply in camping, 8/1089
 - Chlorine
 - bleach in refinishing, 7/1058
 - in fertilizer, 7/1050
 - as swimming-pool disinfectant, 18/2629

- Choke
auto: See Auto choke
boat, checking, 7/977
Chopped-van mini-motor home,
3/400
Chromatic aberration, in binoculars,
2/267
Chum salmon, identifying, 8/1105
Circle gauge, 5/746
Circuit breaker, 6/926
in alternator regulator, 1/86
in auto appliances, 6/911
for boats, 3/322
in hot-air gas furnace, checking,
9/1334
in travel trailer, 3/402
Circuitry, solid state, in intercom
system, 10/1464
Circuits
alternating current, 6/923
Circuits, electric
adding, 4/584
in range, 7/931
voltage-doubler, 18/2691
Circuits, electronic
in anemometer, 21/3097
half-lattice, 7/954
Pierce, 7/958
resonant, 7/954
vectorboard for tone generator,
18/2748
Circular saw
beveling with, 18/2769
Circular saw
building with, 5/714; 6/801, 900;
8/1208
choosing, 14/2052
crosscutting with, 18/2769
for cutting acrylic sheet, 16/2421;
17/2580
for cutting plastic laminate, 10/1496
dado head for, 10/1459
on electric drill, 6/856
how to use, 18/2768
for inlay work, 10/1459
mitering with, 18/2769
for moldings, 21/3167
for picture frames, 13/1999
for room divider, 17/2541
for straight cuts, 5/725
for window frames, 21/3113
Circulating stoves, 17/2582
Citizens' band radio, 4/589
crystal filters, 7/954
crystals, 7/951
Clambake, in foil, 12/1796
Clamping
with adhesives, 1/41
jig, for end table, 17/2512
methods of, 10/1411
auto radiator hose, 6/690
band, 10/1412
in door construction, 3/372
in doweling, 6/840
gluing, 2/167; 4/598; 6/902; 8/1213;
12/1705
inlaid wood turning, 10/1452
for matching sides of corner cabinet,
3/384
metal in wood bending, 21/3140
pipe, 3/349
sheer, 2/289, 306
storage of, 9/1302
types of, 9/1318
Clay, pottery, 4/531
Cleaner
for carburetor dirt, 4/469
drain, chemical, 14/2020
PVC for directional microphone,
11/1660
Clearance, for power tools in
workshop, 9/1303
Clearance lights, for boat trailer,
19/2827
Cleats
bolted, 3/322
in furniture building, 3/339
secure, for boat, 3/331
wood, for corner cabinet, 3/386
Climatic Atlas of the U.S., 9/1330
Clinch knot, 10/1511
Clock
banjo wall, 4/594
controlled by pendulum, 7/952
crown moldings for, 12/1705
grandfather's, 4/597
motor in washing machine timer,
20/3021
quartz crystal as timing element of,
7/959
in spice rack, 17/2478
Clock movement
battery-operated, 4/594, 602
electric, 4/599
Closets
in added rooms, 9/1377
cedar, building, 4/609
extra shelf space in, 4/608
rack for storing lumber, 11/1612
roll-away, 4/612
storage for model-car track layout,
11/1698
Cloth, plasticized, for jogging
machine, 7/1017
Clothes chute, for laundry, 11/1565
Clothes dryer
placement of, 11/1566
troubleshooting chart, 20/3034
Clothing
cold insulator, 17/2604
protection against snakes, 16/2452
Clouds
as weather indicators, 3/429;
20/3061
Clutch
manual, maintenance of, 4/615
in minibike, 11/1669
for sternwheeler boat, 12/1802
switch, 7/990
CNR, contour chart of airport
noises, 12/1736
Coarse-edged tools, sharpening,
16/2343
Coast Guard, call in boat
emergency, 7/978
Coast Pilot books, 20/3062
Coffee-can Carronade, 15/2280
Coffee makers, repairing, 5/623
Coffee table, 18/2638
contemporary, 8/1168
drop-leaf, 18/2634
Coho salmon, identifying, 8/1105
Coils
electronic, and capacitors, 7/952
spare, in boat tool kit, 7/974
wound, 6/923
Coleus, 9/1257
Collar beam, dormer, 6/834
Collision bearing, in boating,
12/1714
Colonial furniture
canopy bed, 6/906
carved, 4/497
desk, 5/768
dry sink, 6/893
hutch, 6/900
porch seats, 6/904
color
adjusting TV, 5/631
choice of, for roof, 15/2177
for concrete, 3/363; 5/659, 666
for fishing lures, 11/1615
house, effect on temperature, 5/660
modifying, 5/747
planning, for kitchen, 20/3008
Color, generator, 5/632, 644
Color television: See Television
"Color temperature," of fluorescent
lighting, 10/1440
Columns
molding around base, 12/1704
multi-sided, 10/1411
Combination lock, 11/1586
Combination saw blade, 19/2783
Combustion chamber, of outboard
motor, 7/960
Communication systems
intercom, home, 10/1464
light-wave, 5/647
CB radio, 4/589
Commutators
in auto starter, 7/993
in vacuum cleaner, 20/2936
Companion planting in organic
gardening, 12/1756
Compass
checking by North Star, 6/783
points, 12/1723
steering by, 12/1722
in weather forecasting, 20/3068
Compost
how to make, 12/1752
in organic gardening, 12/1750
starting in fall, 9/1245
Compound
for acrylic, 17/2580
anchoring, 5/665
for brake line, 6/882
buffing, with pad sander, 15/2264
caulking, 4/514; 11/1657
gasket, 7/984
glazing, 9/1290; 21/3109
jointing, for gypsum panels, 20/2988
pipe joint, 7/1033; 14/2019
plastic, 14/2024
plastic grouting, 8/1114
roof patching, 15/2191
silicone rubber, 4/514, 516; 17/2472
stucco patching, 11/1657
Tripoli polishing, 4/500
valve, 16/2358
water-repellent, 18/2713
Compressed air
to clean carburetor, 4/477
in drying carburetor, 4/474
Compression test
in abnormal vacuum gauge reading,
20/2940
for auto engine, 4/469; 7/1004
in auto engine valve and ring job,
20/2943
for cylinder head gasket, 7/983
in tuning auto, 19/2902
for Wankel engine, 19/2922
Compressor
air, for scuba diving, 16/2324
auto engine spray gun air
supply, 14/2157
electronic, for tape player, 18/2664
paint sprayer, 14/2156
refrigerator, 14/2121
Computer, personal, 5/652
Concrete: see also Masonry
adding color to, 5/666
aggregate in, 5/657
bench, 12/1764
birdbath, 12/1763
building with, 5/658
casting decorative objects, 5/675;
12/1763, 1764
caulking cracks in, 4/516
curb for brick walk, 3/367
damp-curing, 11/1645
epoxy, for stone foyer, 8/1144
for fences, 7/1037
as fireplace base, 7/1081
flags for patio, 3/368
floors, 3/356; 8/1110; 16/2370
forms for steps, 11/1646
garage floor, 16/2370
home improvements, 11/1643
how to mix and pour, 5/658
lightweight, 5/675
painting, 8/1110
for patio floor, 3/356
pier blocks, 5/729, 739
planter, 5/675
for post holes, 7/1039; 13/1924
poured, 7/1039
ready-mixed, 9/1380; 11/1645
walks, 11/1643
Concrete block
as barn foundation, 9/1280
for fence, 9/1267
as foundation walls, 9/1381
laying, 5/657
for partitions and screens, 5/667

- as piers for decks, 5/729, 739
- as walls for new home, 10/1405
- Condensation
 - on basement walls, 11/1655
 - on pipe, 14/2024
 - on toilet tank, 18/2741, 2743
- Condenser
 - air conditioner, 1/61
 - auto, 10/1433
 - checking in tune-up, 19/2912
 - eliminated in electronic ignition system, 10/1434
 - refrigerator, 14/2121
 - spare, in boat tool kit, 7/974
- Connecting rods
 - cause of oil leakage, 12/1745
 - servicing, 20/2948
- Constant velocity joint, front-wheel drive, 1/148, 150, 151
- Construction, home
 - crawl-space, 10/1400
 - open plan, 10/1402
 - Contact cement, 1/40; 4/505, 513; 5/725; 7/1017, 1026; 8/1173; 10/1496; 13/1893; 21/3151
- Controls
 - auto, electric, 6/911, 915
 - brightness, in TV, 18/2677
 - of electric range, 7/933
 - in electronic ignition system, 10/1434
 - remote, 14/2138; 20/3015
 - television, adjusting, 18/2676
 - of washing machine, 20/3021
- Convection cooking, 7/943
- Cooking
 - back yard, 3/415
 - convection, 7/943
 - electronic, 7/942
 - microwave oven, 7/943
 - outdoor, 12/1780, 1782, 1784, 1792, 1798
 - rigs, improvised, 12/1784
- Cooling
 - capacity, air conditioner, 1/55
 - for overhead projector, 14/2070
 - without air conditioning, 5/680
- Cooling system
 - auto, 5/684; 7/1000
 - boat, flushing, 17/2559
 - home, reducing cost of, 9/1328
- Coping, for stone retaining wall, 17/2527
- Coping saw
 - in ceiling tile installation, 4/524
 - for cutting curves, 4/603
 - for decoys, 5/758
 - with metal-cutting blade, 7/979
 - for removing excess wood, 6/805
 - for trimming, 4/594
- Copper
 - flushing, 6/836
 - gaskets, 7/983
 - piping, for water system, 16/2438
 - roofing, 15/2175
- Cork
 - floors, removing stains from, 17/2485
 - gaskets, 7/987
- Corner desk set, 5/771
- Corner display cabinet, 3/384
- Cornices, roof, for home addition, 9/1390
- Corridor kitchen, 10/1482, 1489
- Corundum, as abrasive, 16/2346
- Cotton rope, 10/1516
- Crack-sealed meal, as fertilizer, 12/1752
- Counters
 - decorating ideas, 20/3004
 - kitchen, lighting, 10/1442
 - plastic laminates for, 10/1496
 - space for, 10/1486, 1491
- Countertop
 - in bed storage unit, 17/2531
 - ceramic tiling of, 4/537
- Cove cutting
 - with multiple saw blades, 19/2790
 - with wood shaper, 21/3203
- Cove molding, 2/166
 - base, installing, 8/1122
 - in bath tiling, 2/200
 - in roof repair, 15/2191
 - vinyl, 8/1122
- Coverage, of roofing material, 15/2178
- Cracking, of paint, 11/1630; 12/1827
- Cracks
 - driveway, patching, 6/875
 - in interior walls, 12/1852
 - plaster, filling, 13/1917
- Cradle, building, 8/1160
- Craft projects
 - decorating with felt and yarn, 21/3208
 - decorative plaques, 5/701
 - jewelry, flashing, 5/706
 - toys, flashing, 5/706
- Craftsmanship wilderness, 5/709
- Cranberries, wild, 12/1791
- Crankcase
 - excessive pressure causing oil loss, 12/1744
 - oil, 4/580; 5/691; 7/997
 - Crappie, identifying, 8/1102
- Cratering, of paint, 12/1824
- Crazing, of paint, 12/1824
- Crawl space
 - in adding bathroom to home, 9/1382
 - construction in new home, 10/1400
- Crawl stroke, 17/2620
- in swimming underwater, 17/2624
- Crocus bulbs, planting, 8/1127
- Cropping, of pictures for framing, 13/2008
- Crosscut saw, 3/413; 15/2277
 - blade, 19/2782
 - sharpening, 16/2355
- Crosscutting
 - with circular saw, 18/2769
 - with table saw, 18/2652
- Crossing situation in boating, rules for, 12/1714
- Cross signals in boating, prohibited, 12/1713
- Crosstalk
 - in cassette player, 4/509
 - of recorded tape, 18/2662
- Crown moldings, 12/1705
 - for console cabinet, 3/376
 - for stereo speaker end tables, 17/2513
- Crystal
 - microphone, 11/1663
 - oscillators, 7/958
 - radio, 7/951
 - transmitting, in CB radio operations, 4/590
- Cucumbers, 9/1242
- Cultivator, in gardening, 19/2779
- Cupboards
 - adding, in remodeling, 1/34
 - between kitchen and dining room, 10/1483
 - drawer for wallbed unit, 2/244
 - for fence storage shed, 7/1046
 - for laundry area, 11/1566
- Cupola, building, 5/714
- Curbs
 - concrete, for brick walk, 3/367
 - masonry, building, 17/2525
- Curing
 - of concrete, 5/569
 - in stucco repair, 17/2598
- Current, electric
 - alternating, in auto alternator, 1/85
 - checking, in boating, 12/1731
 - direct, in auto alternator, 1/85
 - direct, in battery, 2/211
 - home, 6/924
- Current, unit of, defined, 6/922
- Curvature, in binoculars, 2/267
- Curving, of wood, 21/3139
- Cut-off saw, how to use, 18/2768
- Cut-off wheel, silicon-carbide, 19/2784
- Cut-running pliers, 9/1290
- Cuts
 - in bending wood, 21/3139
 - of quartz crystal, 7/955
 - in wood-turning, 11/1552
- Cutters
 - for acrylic sheet, 17/2580
 - linoleum, 14/2067
 - pipe and tube, types of, 9/1316
- Cutting
 - decorative, with multiple blades, 19/2789
 - large workpieces, 19/2804
- Cutting board, of acrylic plastic, 14/2012
- Cuttings
 - herb, rooting, 9/1349
 - how to root, 9/1243
- Cyclops, burglar alarm, 1/80
- Cylinder
 - assembly in power steering, 14/2048
 - auto, isolating weak, 20/2942
 - boat, checking, 7/976
 - distorted, as cause of oil leakage, 12/1745
 - gasket, 7/982
 - hydraulic, 10/1431
 - replacing spark plugs, 13/1906
 - roller, paint, 12/1811
 - shaped on lathe, 11/1547
 - vacuum, in power brakes, 6/887
 - wheel, auto, 10/1432
- Cypress
 - in boat building, 2/286
 - for Dutch Colonial seats, 6/904
 - for house siding, 16/2427

D

- Dacron
 - for sleeping bag, 3/447
 - rope, for boat use, 11/1634
- Dado head
 - for circular saw, 10/1459
 - for table saw, 21/3153
- Dado jointing, basics of, 21/3152
- Dado saw, for grooving, 6/869
- Daffodils, 9/1257
 - planting bulbs 8/1126
 - dahlias, 8/1124; 9/1257
- Damp-curing concrete, 11/1645
- Damper, fireplace, 5/681; 7/1073
- Dampness
 - basement, 2/180; 11/1655
 - in bathroom laundry, 11/1564
 - in workshop, 9/1303
- Dandelion, 12/1789
- Dandelion digger, 19/2781
- Danger zone, of boat, 12/1714
- Darkroom, photographic
 - building, 5/717
 - safelight for, 5/723
- Dashboard gauges, auto, 6/915
- db (decibel), 7/950
- DC circuits, defined, 6/923
- DC generator, auto. See Automobile generator
- Deacon's bench, building, 5/725
- Dead-bolt lock, 11/1588
- Dead center, of lathe tailstock, 11/1548
- Dead man's throttle
 - on mini-hydrofoil, 14/2086
- on motorized surfboard, 15/2210
- Decals
 - for chef's cart, 4/488
 - for dry sink, 6/899
- Decibel (db), 7/950
- Decks
 - boat, 2/293
 - for paddleboard, 2/310
 - lawn, 5/738
 - patio, 5/728
 - plywood for, 2/282; 10/1526
- Decorations
 - carving in wood, 4/495, 501
 - decoupage, 5/748
 - eggs, 6/909
 - felt and yarn, 21/3205

- Pennsylvania Dutch-style, 5/745;
31/3205
- Decoupage, 5/748
- Decoys
in dove hunting, 10/1427
flying, how to make, 5/754
for waterfowl hunting, 5/756;
10/1423
- Degree day value, 9/1330
- Dehumidifier
in air conditioning, 1/52
for basement, 11/1655
electric, 14/2025
for sticking doors, 21/3107
for workshop, 9/1303; 21/3200
- Delphiniums, 8/1124; 9/1259
- Demagnetization, of color television,
5/634
- Dents, auto, repairing, 12/1820;
14/2151
- Depth finder
in boating, 12/1731
interference with, 7/960
- Depth of field, in photography,
13/1940
- Deraileur, gear system, 2/252, 259
servicing, 2/260
- Designs
for carpet tile, 18/2717
for egg decoration, 6/910
for felt decorations, 21/3206
for fishing lures, 11/1616
inlaid veneer picture, 10/1446
for inlay work, 10/1458
in painting wood floor, 8/1110
for patios, 10/1540; 13/1919
Pennsylvania Dutch-style, 5/745
spatter dish, for floor, 8/1111
stylized, 5/746
for wall plaque, 5/703
for wood carving, 4/498
- Desk
antiqued, 5/762
in bed storage unit, 17/2531
Colonial, 5/768
corner, 5/771
in free-standing storage wall,
17/2572
modern, 8/1183
in room divider, 17/2541
secretary, 5/762
typewriter supports for, 3/374
workshop combination, 21/3203
- Deviation
in photomicrography, 13/1978
in steering of boat, 12/1725
table, 12/1729
- Diamond-point chisel, 11/1556
- Diaphragm
in air cannon, 15/2281
in automatic choke, 4/578
fuel pump, 8/1147
of loudspeaker, 15/2286
for paint sprayer, 14/2156
- Dichondra grass, for lawn, 11/1574
- Dies, for shell case converting,
16/2382
- Diesel engine, 1/160
- Dimmers
light, 6/777
in kitchen, 10/1442
- Dinghy
sailing, 15/2218
suspension storage of, 17/2563
- Diode/leakage scale, to test auto
condenser leakage, 7/970
- Diode, silicon rectifier, in alternator,
1/85
- Diopter scale, in binoculars, 2/266
- Directional lights, auto, 6/913
- Direction finders
interference with, 7/960
wilderness, 6/782
- Disc: *See also* Disk
- Disc brakes
auto, servicing, 6/786
fixed caliper type, 6/787, 789
floating caliper type, 6/787, 789
in minibike, 11/1670
- Dishwasher
built-in, placement of, 10/1491
door gasket repair, 4/516
placing in kitchen, 10/1483
plan for future, 10/1403
repairing, 6/791
- Disk: *see also* Disc
- Disk sander, 8/1106, 1145, 1187
choosing, 14/2054
on electric drill, 1/27; 6/856
- Displacement engines, 1/157
- Display
cabinet, 6/801
computer, 5/655
- Distilled water, in electric steam
iron, 10/1473
- Distortion of sound
in AC/DC radio, 9/1358
in tape player, 18/2662
- Distributor
in boat engine, 2/312
body, cleaning, 7/1002
checking in tune-up, 19/2903
removal of, 19/2911
replacement of, 13/1905
in Wankel engine, 19/2921
- Distributor points
boat, checking, 7/975
spare, in boat tool kit, 7/974
- Distributor shaft
in auto engine, 10/1433
tracking noise in, 14/2150
- Divider planter, as new front for
home, 9/1373
concrete block as, 5/671
- Divider, room
closets as, 4/611
entertainment center as, 8/1170
fireplace as, 7/1082
- Dividers
in photomicrography, 13/1979
for use with lathe, 11/1549
- Diving
board, swimming pool, 18/2627
scuba, 16/2319
for sea shells, 16/2360
in swimming underwater, 17/2619
- Docking
big boat, 3/316
techniques of, 6/806, 810
- Documents, mounting with
decoupage, 5/748
- Dog, on camping trip, 20/3079
- Doorbells, installing, 6/822
- Door chimes, installing, 6/815
- Door frames
caulk against weather, 4/513
in home addition, 9/1386
standard for new home, 10/1406
- Door hardware
catch, magnetic, 6/899
doorlatch keeper, 6/829
hinges, 6/827; 15/2234
locks, repairing, 11/1586
openers, electric, 6/823
tracks, sliding, 5/720, 775; 6/851;
8/1172, 1179
- Doors: *See also* Door frames, Door
hardware
cedar closet, 4/614
for console cabinet, 3/381
for corner cabinet, 3/388
for darkroom, 5/720
draftproof, 20/3069
for dry sink, 6/897
Dutch, 9/1288
for fence storage shed, 7/1046
garage, 8/1218, 1223, 1230;
12/1703
hollow-core, 4/609
in installing wall paneling, 13/1858
oven, 7/931, 932
overlapping, 3/392
painting, 6/830; 12/1839, 1841
panel molding, for, 12/1705
for patio or breezeway, 3/353
problem-solving, 21/3106
removing paint from, 16/2458
repairing locks, 11/1586
- screen, care of, 21/3107
- shower, 7/979; 16/2419
- sliding, 5/720, 775; 6/851; 8/1172,
1179
- square-edge, 6/850
- sticking, 6/827
- storm, 12/1841; 17/2577; 21/3107
- swinging, 6/851
- in van conversion, 20/2963
- for wall cabinet, 3/370
- weatherstripping, 5/681; 6/829;
9/1329; 21/3107
- in wood stoves, 17/2582, 2584
- Door seal, of microwave oven, 7/946
- Dormer
gable, 6/831; 10/1400
- hip, 6/831
- insulation of, 9/1329
for new home, 10/1400
shed, 6/831
- Dot pattern, in adjusting TV color,
5/637, 645
- Double early tulips, 8/1129
- Double surgeon knot, 10/1511
- Douglas fir
in boat building, 2/286
in decorative screen, 3/348
for house siding, 16/2427
for paddleboard, 2/308
for plywood, 2/282
for Sea Angler, 2/306
- Dove hunting, 10/1426
- Dovetailing jig, for portable router,
15/2207
- Doweling
on cabinet door, 6/850
edge-to-edge, 6/840
guide, for electric drill, 6/859
jig, 4/565; 6/837
- Dowels
in decorative screen, 3/348
in door construction, 3/372
for dry sink, 6/894
machine-made, 6/865
seat rails for rocker, 8/1205
setting in, 3/347
for shutter vanes, 16/2424
simulated, 6/849
for TV cabinet-bookcase, 3/348
uses of, 6/836
for window screens, 16/2317
- Down
as clothing insulator, 17/2604
for sleeping bag, 3/448
- Downspouts
painting, 12/1843
repairing, 15/2185
- Drainage
for bonsai tree container, 3/336
in new homesite, 10/1399
of rainwater from patio, 5/666
for washing machine, 20/3018
- Drain pump, dishwasher, 6/797
- Drains
chemical cleaner for, 6/842
clogged, 6/842; 14/2020
sewage, underground, 6/847
- Draperies, for summer cooling, 5/682
- Drawers
in built-ins, 6/852
for cabinets, 6/849; 10/1411
in child's footlocker, 8/1163
for dry sink, 6/897
false front, 8/1165
for fence storage shed, 7/1046
for game table, 8/1213
modular, for laundry center,
11/1569
modular unit, for server, 16/2333
pigeonhole, 5/770
pulls, 3/394
in room divider, 17/2546
for sewing cabinet, 8/1175
in spice cabinet, 17/2480
in storage wall, free-standing,
17/2575
for tool chest, 18/2760
for wallbed unit, 2/244
for wardrobe, 8/1178

- in workbench, 21/3174, 3185
 - workshop, 6/855
 - Drawing board, in workbench, 21/3182
 - Drill
 - attachments, power, 6/856
 - for back pack frame, 9/1366
 - electric, 1/27; 6/856, 909; 8/1226; 14/2118
 - choosing, 14/2052
 - for masonry, 3/355; 6/820; 13/1881; 14/2056
 - quality of, 9/1301
 - star, 6/820
 - types of, 9/1309
 - Drill press, 4/498; 5/727; 6/859
 - decorative cuts with, 19/2792
 - for inlay work, 10/1458
 - jointing with, 19/2797
 - in making trays, 19/2860
 - for moldings, 21/3167
 - for picture frames, 13/1999
 - radial arm saw as, 14/2094, 2099
 - routing with, 6/869
 - Drive belt
 - in cassette player, 4/507
 - in power steering, 14/2051
 - Drive gear assembly, in auto starter, 7/990
 - Drive system, minibike, 11/1670
 - Driveway
 - concrete, 11/1645
 - patching, 6/875
 - Driving, safety tips, 15/2246
 - Dropper loop knot, 10/1511
 - Drowning, avoiding, 15/2248
 - Brown-proof, make yourself, 17/2610
 - Drum brakes
 - auto, 6/787, 876
 - in minibike, 11/1670
 - Drum sander, 8/1106, 1187
 - choosing, 14/2059
 - Dry sink, building, 6/893
 - Dry wall, stone, 17/2527
 - Dry wall, gypsum, 2/186
 - Dual-control faucet, 7/1032
 - Duck
 - boat, camouflaging, 6/891
 - hunting, 6/891; 10/1423
 - recipe for baking, 10/1425
 - Ductwork
 - in air conditioning, 1/53
 - for range hood, 20/2966
 - Dumbwaiter, for laundry, 11/1565
 - Dunking of boat trailer, in launching, 19/2815, 2821
 - Duo-diode rectifier, in TV repair, 18/2699
 - Dutch Colonial seats, 6/904
 - Duty rating, in buying ladders, 10/1521
 - Dwell, in electronic ignition system, 14/2436
 - Dwellmeter, 7/967, 1005; 10/1436; 19/2910
 - Dwell-tachometer, 7/1005
 - Dyes, painting with, 12/1815
 - Dynamic loudspeaker, 15/2286
- E**
- Early American design
 - canopy bed, 6/906
 - dry sink, 6/893
 - Dutch colonial porch seats, 6/904
 - footlocker, 8/1163
 - furniture, restoring, 8/1203
 - hutch, 6/900
 - spice rack, 17/2480
 - Earphones, with parabolic microphone, 11/1666
 - Eastern exposure
 - in landscaping, 10/1534
 - in patio design, 13/1922
 - Ecology
 - in kitchen planning, 10/1481
 - in landscaping plan, 9/1269
 - Economizer, in carburetor, 4/479
 - Edge grooving
 - with drill press, 6/872
 - with portable router, 15/2206
 - Edgers, turf and grass, 19/2781
 - Edges, of lumber, 11/1599
 - Edge-to-edge doweling, 6/840
 - Edging, masonry, building, 17/2525
 - EER (energy efficiency rating), 1/54
 - Efflorescence, removal of
 - from interior walls, 2/184
 - from outside walls, 11/1654
 - Eggs, decorating, 6/909
 - Electric (Electrical)
 - appliances: *See* Appliances, electric
 - blackouts, 8/1159; 10/1486
 - cable, armored, 14/2138; 21/3139
 - circuit box, 4/584
 - circuit breaker: *See* Circuit breaker
 - circuits, in auto, 19/2902
 - coils, wound, 6/923
 - combination switches, 20/3010
 - conduit, bringing into house, 4/588
 - connections, making, 6/920
 - control panel for darkroom, 5/721
 - controls, auto, 6/911, 915
 - current, 1/85; 2/211; 6/922, 924
 - door openers, 6/823
 - entrance head, 6/925
 - equipment for boats, 3/322
 - fans, rating of, 20/2965
 - gauge circuit, auto, 6/915
 - glue-setting unit, 13/1869
 - heater elements in range, 7/931
 - home heating system, 8/1151; 10/1406
 - in ignition system, 10/1433
 - iron cord, testing, 10/1471
 - junction box, for cable, 21/3130
 - light dimmers, 6/777
 - outlet, as "cover-up," 4/587
 - panel board, 6/925
 - plugs, grounded, 21/3201
 - power failure, security sensor against, 10/1407
 - range, repairing, 7/931
 - receptacles, grounded, 21/3123
 - resistors, 6/923
 - safe wiring indicator, 21/3123
 - service, availability of, at new home site, 10/1400
 - service drop, 6/925
 - service needs, estimating, 6/927
 - single pole switches, 20/3013
 - single-wire system, 6/912
 - supply, for washing machine, 20/3018
 - system, boat, 7/974
 - system, home, analyzing, 6/924
 - terminal connections, 21/3136
 - terminals, in fluorescent lights, 8/1134
 - transformer, step-down, 6/815, 822
 - wall receptacles, dimmers unsafe in, 6/780
 - wires, splicing, 17/2482
 - work, techniques of, 21/3121, 3129
 - Electric drill, 8/1226; 14/2118
 - choosing, 14/2052
 - for cutting eggshell, 6/909
 - in masonry, 3/355; 6/820; 13/1881; 14/2056
 - in metal work, 1/27
 - quality of, 9/1301
 - uses of, 6/856
 - Electrician's chisel, 4/570
 - Electricity
 - adding a circuit, 4/584
 - in auto ignition system, 10/1433, 1435
 - calculating cost of, in air conditioning, 1/58
 - direct current, in battery, 2/211
 - understanding terms in, 6/922
 - working safely with, 21/3118
 - Electrodes
 - of auto spark plugs, 16/2464
 - in fluorescent light, 8/1135
 - of quartz crystal, 7/954
 - Electrolyte, in battery, 2/212
 - Electromotive force (EMF), defined, 6/922
 - Electron
 - beam, in TV picture, 18/2672
 - gun, in color TV tube, 5/636
 - Electronics: *See also* High fidelity; Radio; Television
 - auto, 1/153
 - anemometer, 21/3087
 - boat radio, static in, 7/960
 - burglar alarm, 1/80
 - car stereo, 17/2501
 - computer, personal, 5/652
 - convection cooking, 7/943
 - cooking, 7/942
 - equipment for mechanics, 7/966
 - flash photos through microscope, 13/1983
 - impulse pickup, 10/1434
 - intercom system, home, 10/1464
 - language of, 7/948
 - LEDs used as flashers, 5/707
 - little black box, 1/155
 - microwave oven, 7/942
 - navigational equipment, 7/960
 - nine-unit stereo speaker, 17/2471
 - personal computers, 5/652
 - phone scrambler, 18/2664
 - quartz crystal, 7/951
 - radio crystal, 7/951
 - spectrum, 5/647
 - stereo equipment, choosing, 17/2497
 - stereo speakers, 17/2505, 2511
 - strobe unit, 17/2588
 - tone and chord generator, 18/2745
 - Tripmaster, 1/156
 - unit of measure, 7/948
 - video, home, 20/2974
 - Electro-optics, 5/647
 - Embossing, with fly-cutter, 19/2794
 - Emergency
 - boat repairs, 7/974
 - brake, 6/787
 - flashlight, 21/3196
 - radio channel, 4/591
 - shelter, 5/709
 - Emery, as abrasive, 1/25; 16/2346
 - Emission controls, auto, 7/1006
 - Enamel
 - alkyd, for boat painting, 11/1628
 - for concrete floor, 8/1110
 - deck, for wood floor, 8/1110
 - to marbleize plywood, 12/1817
 - paintbrush for, 12/1807
 - End boring, with radial arm saw, 14/2100
 - End knot, 10/1517
 - End loop knot, 10/1511
 - End-to-end splice, for electrical wiring, 17/2483
 - End wrench, in boat tool kit, 7/974
 - Energy efficiency rating (EER), 1/54
 - Energy, solar, 16/2453
 - Energy, wind-generated, 21/3100
 - Engine
 - auto: *See* Auto engine
 - boat, 2/311; 7/963, 974; 12/1800
 - for mini-hydrofoil, 14/2091
 - for motorized surfboard, 15/2210
 - outboard ignition system, 7/960
 - for Sea Angler, 2/299
 - small, repair of, 7/1010
 - for ultralight aircraft, 1/67
 - variable displacement, 1/157
 - Englishman's tie knot, 10/1516
 - Enlargement, in photography, 13/1941
 - Enlarger, for darkroom, 5/717
 - Entertainment
 - as factor in landscaping, 9/1263
 - center, modular, 8/1168
 - Epitrochoid chamber, 15/2197
 - Epoxy
 - adhesive, for tile-setting, 18/2721
 - cement, 5/662; 21/3091
 - concrete for stone foyer, 8/1144
 - glue, 1/41; 2/180; 8/1199

paint, 12/1843
 removal of, 16/2458
 repair kits, auto dents, 14/2151
 sealant for concrete floor, 8/1110
 sealer, 2/184
 in ultralight aircraft, 1/65, 67
 Equalizing hitch, for trailer, 19/2807, 2810
 Etching solution, in auto painting, 12/1820
 Ethylene glycol (antifreeze), 5/691
 Evaporative emission control, 1/120
 on Wankel engine, 19/2920
 Evaporator
 air conditioner, 1/61
 refrigerator, 14/2121
 Evergreens
 cuttings from, 9/1244
 grafting, 9/1292
 trees, 19/2874
 Exercise equipment, 7/1014, 1020
 Exhaust
 analyzer, auto, 4/474; 7/1006
 control, in air conditioner, 1/55
 emission regulations, auto, 10/1434
 fan, 5/682, 683, 720, 721; 10/1406
 gas recirculation (EGR) system, 1/121, 155; 20/2941
 manifold, auto, 1/46; 7/986
 pipes, auto, replacing, 13/1913
 system, auto, restricted by carbon, 20/2941
 Experiments, scientific
 air cannon, 15/2280
 directional microphone, 11/1658
 loudspeakers, 15/2286
 parabolic microphone, 11/1665
 power supply for, 21/3196
 Schlieren optics, 15/2292
 with strobe unit, 17/2587
 Exposure
 of homesite, in landscaping, 10/1534
 in macrophotography, 11/1625
 meter, 13/1947, 1977
 in photomicrography, 13/1984
 in strobe photography, 17/2595
 table, camera, 13/1939
 Extension ladder, 10/1519
 Extension slide, for folding rule, 9/1300

F

Fabergé decorated eggs, 6/909
 Fabrics
 auto upholstery, cleaning, 19/2928
 boat upholstery, 3/322
 bonding of, 1/40
 painting with dyes, 12/1815
 for Parsons table, 13/1894
 Face moldings, 21/3170
 Faceplate, lathe, 11/1550
 Face veneers, of plywood, 11/1601
 False table, used with molding cutter, 19/2805
 Family room, converting garage to, 8/1229
 Fan belt
 auto, 1/86; 13/1913
 boat, broken, 7/977
 Fans
 attic, 5/682; 10/1406
 auto radiator, 5/685
 for darkroom, 5/720
 exhaust, 5/683
 rating of, 20/2965
 refrigerator-freezer, 14/2125
 roof, 20/2968
 window, 5/683
 Farad, defined, 7/948
 Faucets
 repairing, 7/1027; 14/2021
 replacing, 7/1032; 14/2024
 Feathers, for sleeping bag, 3/448
 Federal Boat Safety Act of 1971, 15/2238
 Federal Communications Commission, 4/578, 589

Federal Housing Authority, and mobile homes, 11/1681
 Federal Seed Act, 11/1580
 Federal Trade Commission, 10/1522
 Feedback
 in crystal oscillators, 7/959
 in public address system, 14/2080
 Feed lines, water, altering, 7/1033
 Feeler gauge
 in adjusting ignition points, 19/2909
 in servicing auto piston, 20/2949
 in servicing auto valves, 20/2953
 Feet-first dive, 17/2622
 Feil
 asphalt-impregnated, 6/834
 decorating with, 21/3205
 roofing, 15/2188
 Fences
 building, 7/1036
 concrete block, 9/1267
 as new face for home, 9/1372
 painting, 12/1844
 for privacy, 10/1537
 storage area built into, 7/1042
 translucent, 13/1881
 Fertilizers
 chemical, 12/1748
 for fluorescent-light gardening, 8/1142
 garden, 9/1250
 for lawns, 11/1577
 organic, 12/1748
 selecting, 7/1048
 Fescue grass, for lawn, 11/1574, 1580
 Fiberboard
 ceiling tiles, 4/522
 to muffle sound transmission, 4/522
 prefinished, as house siding, 16/2472
 sheathing, 9/1387
 Fiberglass
 adhesives for applying, 1/42
 bathroom walls, 2/208
 in boat building, 2/292, 306, 308, 310; 3/321; 11/1629
 ceilings, luminous, 13/1890
 garage doors, 8/1218
 in home insulation, 10/1395
 insulation for suana, 15/2270
 ladders, 10/1519
 motorized surfboard, 15/2212
 patio screening, 3/353
 solar greenhouse, 9/1296
 travel trailer, 3/398
 ultralight aircraft, 1/65
 wall panels, 13/1870
 window screening, 16/2317
 Fifth wheel trailer, 3/399; 19/2809
 Figure eight knot, 10/1517
 Files, steel
 making into chisels, 4/499
 types of, 9/1308
 Film
 camera, 13/1938
 on camping trips, 3/432
 for photographing television scenes, 13/1955
 Filters
 air, in auto, 7/1051; 19/2918
 air conditioner, 1/61
 in anemometer, 21/3088
 application of crystals in, 7/959
 bandpass, 7/959
 color, in photomicrography, 13/1984
 crystal, 7/954
 dishwasher, 6/793
 fuel, 7/1051; 8/1147; 11/1639; 12/1775
 gas furnace, replacing, 9/1339
 for light dimmer, 6/778
 oil, 7/1003; 11/1639; 19/2847, 2920
 photographic, 3/434; 13/1944, 1976, 1991, 1995
 in power brakes, 6/890
 safelight, 5/723
 for swimming pool, 18/2627
 water, 16/2438
 Filtration of water supply, 8/1089

Financing
 mobile home purchase, 11/1679
 of swimming pool, 18/2627
 Fine-edged tools, sharpening, 16/2343
 Fine-tuning, of television, 18/2676
 Finishers
 antique, for furniture, 1/123; 5/764; 17/2493
 in boat construction, 3/321
 cabinet, 5/746; 6/805
 for cabinet woods, 4/607
 for concrete, 5/659
 for entertainment center, 8/1173
 for fine wood, 7/1067
 for inlaid picture, 10/1450
 lacquer-type, 4/499
 linseed oil, 4/498; 7/1071
 natural wood, 3/347; 10/1411; 12/1839
 paint, 7/1060
 pickled, 17/2493
 for picture frames, 13/2007
 plastic resin, for wood floor, 8/1107
 preparing wood for, 7/1062
 removers for, 7/1057
 satin varnish, 8/1168
 semi-gloss wood, 5/750
 shellac, 7/1060; 10/1450; 11/1604
 stain, for wood, 17/2488
 stucco, 17/2600
 varnish, 7/1060
 waterproof, 11/1604
 for wood carvings, 4/498
 wood, sanding, 15/2262
 Finishing cut, in wood-turning, 11/1553
 Finishing nails, 12/1707
 Fins, for snorkeling, 16/2319
 Fire
 building in fireplace, 7/1079; 8/1086
 when camping, 3/408; 8/1089
 prevention, home, 15/2242
 resistance of roofing materials, 15/2178
 Fire alarm, self-contained, 10/1407
 Fireplace
 for back yard barbecue, 2/164
 ceramic tile for, 18/2719
 fire building in, 8/1086
 free-standing, 7/1080
 hearth firebricks, replacing, 7/1077
 maintenance of, 7/1073
 prefabricated, 7/1080
 Firewood, 8/1085
 storage of, 8/1087
 First aid
 in frostbite, 17/2606
 kit, for camping trips, 3/443; 8/1088
 for snakebite, 16/2451
 Fisherman's bend knot, 10/1516
 Fishing
 bass, tying flies for, 2/189
 cabinet for gear, 17/2564
 fly casting schools, 8/1093
 identifying catch, 8/1100
 knives and axes for, 10/1502
 knots, tying, 10/1511
 leaders, 10/1514
 lures, overhauling, 11/1615
 outboard motor for, 12/1771
 with outriggers, 19/2891
 skiff, 16/2442
 spearfishing, 16/2320
 tent for, 18/2707
 tricks for success, 8/1096
 trolling techniques, 19/2885
 for trout, 19/2893
 tying flies, 2/189
 Fishing holes, in snaking wires, 4/576
 Fish tape, 4/575
 Fixture
 exterior, painting, 12/1841
 lighting, permanent, 6/777
 pole, 13/1900
 wall, mounting, 5/665
 Flags, concrete, for patios, 3/368
 Flagstones
 for patios, 3/368
 for foyer, 8/1144

- Flaking, of paint, 12/1831
 Flameless cooker, 12/1782
Flash equipment
 photographic, 13/1942, 1950
 for camping trips, 4/434
 with microscope, 13/1983
 in photomicrography, 143/1976
Flashings
 caulking compound for, 4/514
 checking for leaks, 11/1654
 checking, in roof repair, 15/2184
 chimney, 7/1077
 cupola, 5/716
 in home addition, 9/1390; 15/2171
 metal, 3/358; 11/1657; 16/2370;
 17/2558
 step, for dormer, 6/836
Flashlight
 battery for, 2/219
 emergency, 21/3196
Flash over, of spark plug insulator,
 16/2424
Flash steam type, of electric iron,
 10/1474
Flat-nose chisel, 11/1548
Flies, fishing, 2/189; 11/1616;
 19/2897
Flint, as abrasive, 1/25
Floating caliper brake, 6/787, 789
Floods
 as factor in choosing homesite,
 10/1399
 security sensors against, 10/1407
Flooring chisel, 4/588
Floors
 in adding rooms, 9/1392
 in attic remodeling, 1/136
 basement, 2/180, 182
 bathroom, tile, 2/202
 carpet tile for, 18/2715
 concrete, 8/1110; 16/2370
 for garage conversion, 8/1235
 hardwood, for new home, 10/1405
 insulating, 9/1329
 for new second story, 15/2174
 painting, 8/1110
 parquet, installing, 8/1119
 patio, building, 3/355
 plastic brick, laying, 8/1114
 polishing, 8/1112
 refinishing, 8/1106
 removing stains from, 17/2485
 self-adhesive vinyl, 8/1116; 10/1403
 soundproof, 12/1735
 tile, for new home, 10/1405
 waxing, 8/1112
Flotation
 aids, for accident victims, 15/2241
 device, in boat emergency, 7/978
 for motorized surfboard, 15/2210
Flowers
 cut, care for, 8/1124
 in landscaping plan, 9/1264
 wild, 20/3073
Flue, chimney
 blockage of, 4/558
 cleaning, 7/1074
Fluid reservoir
 in drum brakes, 6/876
 in hydraulic brakes, 10/1431
Fluorescent lighting
 dimmers for, 6/777
 indoor gardening with, 8/1141
 for kitchen, 10/1440
 lamp, 6/923
 trouble-shooting, 8/1134
 for workshop, 21/3200
Flushometer, for toilet tank, 18/2741
Fly casting
 technique of, 8/1097
 where to learn, 8/1093
Fly-cutter, making decorative cuts
 with, 19/2792
Fly tying for bass fishing, 2/189
Focus
 in binoculars, 2/265
 camera, 13/1937, 1956
 color TV picture, 5/633, 644
 for photomicrography, 13/1975
 of television picture, 18/2679
Foil, aluminum
 for back pack oven, 12/1798
 camp cooking with, 12/1792
 dispenser for, 13/1891
Folk navigation, 12/1730
Food
 camp, 3/415
 guarding from animals, 20/3077
 in packing back pack, 9/1370
 poisoning, 8/1089
 storage unit for, 17/2534
 wild, 12/1787
Footings, concrete, for brick walls,
 3/361
Footlocker, child's, 8/1163
Force cup, rubber, 6/842; 14/2019
Forget-me-nots, 8/1132
Formaldehyde foam, as insulator,
 9/1329
Formica
 for coffee table top, 18/2638
 for kitchen surfaces, 10/1496
 for laundry center surfaces,
 11/1569
 for tailgate extension, 3/406
Forms
 in boat building, 2/288
 for building stone walls, 17/2522
 for concrete walks, 3/367; 11/1644
 for machine molding, 21/3167
 for patio floor, 3/356
 for pouring concrete, 5/659
 for wall plaque, 5/676
Foundation
 addition to home, 9/1378
 boat storage port, 17/2553
 house painting, 12/1840
Fountain, in landscaping plan,
 10/1541
Foxglove, 9/1258
Frames
 back pack, 9/1363
 door, for new home, 10/1406
 for inlaid picture, 10/1449
 picture, 15/1989
 window, for new home, 10/1406
Framing
 in boat building, 2/287
 for child's footlocker, 8/1164
 doors and windows, 8/1231
 for fences, 7/1037
 for little red barn, 9/1282
 for patio deck, 5/734
 second-story addition, 15/2168
 for window screens, 16/2317
Framing chisel, 4/571
Framing square, 6/833; 10/1413,
 1458
Freeze-proofing, 17/2604, 2607
Freezer, kitchen, placement of,
 10/1493
Freezing, security sensor against,
 10/1409
French polishing method, in wood
 finishing, 7/1070
Freon
 in refrigeration, 14/2122
 for snakebite, 16/2452
Frequency
 modulation, 7/957
 for radio-operated garage doors,
 8/1227
 of radio transmitters, 7/951
 variation, causes and cures, 7/957
Fresnel condenser, for overhead
 projector, 14/2070
Front-wheel drive
 servicing, 1/148
 wheel bearings, 2/225
Frostbite
 avoiding in camping, 17/2604
 protecting feet from, 17/2607
Fuel
 heating, 8/1151
 high-octane, 7/985
 oil/gas, for minibike, 11/1669
 for rotary-engine model, 15/2196
 wood, in stoves, 17/2581
Fuel filter
 in chain saw, cleaning, 11/1639
 outboard motor, cleaning, 12/1775
Fuel pump repair, 8/1147; 13/1908
Furnace, hot air, maintenance of,
 9/1334
Furniture: See also specific pieces, as
 Cabinets; Desks; Tables
 bookshelf-table, 3/339
 breakfront china cabinet, 4/561
 bumper pool table, 14/2042
 bunk beds, 2/235
 butter's tray table, 19/2865
 cabinet for sporting equipment,
 6/801
 cabinetmaker's supplies, 3/390
 canopy bed, Colonial, 6/906
 carving wood decorations, 4/495
 chaise, 4/548, 553
 chef's cart, 4/487
 coffee table, 8/1168; 18/2634, 2638
 concrete-top patio table, 5/679
 corner desk set, 5/771
 corner display cabinet, 3/384
 cradle, 8/1160
 deacon's bench, 5/725
 desk, Colonial, 5/768
 desk, modern, 8/1183
 die sink, 6/893
 Dutch Colonial seats, 6/904
 Early American, 6/893, 900, 906;
 17/2480
 end tables, 17/2511; 18/2641
 footlocker, 8/1163
 garden cart planter, 4/491
 glue for, 1/39
 hardboard as backing, 3/349
 hutch, 6/900; 17/2537
 lawn swing, 8/1191
 lectern bookcase, 3/344
 legs: *See Legs*
 library wall cabinet, 3/370
 maintenance of, 3/343
 modular entertainment center,
 8/1170
 patio table, 8/1195
 picnic table, 13/1997
 pool table, 14/2026
 race car bed, 2/240
 restoring, 8/1203
 rocker for patio, 8/1187
 from scrap lumber, 11/1602
 secretary desk, 5/762
 servers, 16/2330, 2337
 sewing cabinet, 8/1174
 sports gear cabinet, 17/2564
 storage unit for folding bed, 17/2531
 storage wall, free-standing, 17/2572
 tables, 18/2641, 2343
 telephone bench, 5/725
 TV cabinet-bookcase, 3/348
 unfinished, 19/2925
 used, 8/1199, 1204
 walibed unit, 2/244
 wardrobe, 8/1178
 workshop desk, 21/3203
Furniture finishes
 antique, 1/123; 5/764
 cabinet, 5/745; 6/805
 equipment for refinishing, 7/1057
 natural wood, 3/347
 Pennsylvania Dutch, 5/745
 prefinished, 3/339
 preparation for, 19/2925
 types, 19/2925
Furring strips
 in ceiling installation, 4/517
 for darkroom construction, 5/720
 in installing wall panels, 13/1856
 in making cupola, 5/714
 for walls, 8/1237
 for wooden deck, 5/744
Fuse
 amperage, 6/912
 in auto appliances, 6/911
 delay type, for boats, 3/322
 electric range, 7/933
 in hot air gas furnace, 9/1334
 in portable TV, 18/2689

Fuse box, 6/925
Fuse panel, 4/584; 6/822

G

Gable roof
economy of, 10/1400
installing dormer in, 6/831
ventilation under, 5/714

Games
chessboard-topped table, 8/1211
pool tables, 14/2026, 2042
tic-tac-toe, 8/1208

Garage
adding space to, 16/2368
converting to family room, 8/1229
lean-to addition for, 16/2369
lengthening, 16/2371
remodeling, 1/32; 8/1229
storing boat in, 17/2559
widening, 16/2370

Garage door
automatic operator, 8/1223
maintenance of, 8/1218

Garden cart planter, 4/491

Garden hose
in cleaning auto engine, 7/1001
in cooling glass break, 9/1295
to lay out curves in concrete walk, 11/1644
outlets in piping system, 16/2438
portable shower, 16/2416
in testing valve lifters, 7/995

Gardening
bonsai trees, 3/334
cuttings, 9/1243
grafting, 9/1292
green-thumb tips, 9/1239
herbs, raising, 9/1349
indoor, with fluorescent light, 8/1141
organic, 9/1241; 12/1748
perennials, 8/1132
plant propagation, 8/1142
potting mixture, 9/1244
preparing for winter, 9/1245
rooting, 9/1239
spring-flowering bulbs, 8/1126
tools, choosing, 19/2779
watering plants, lawns, and trees, 9/1248

Garden lighting, 11/1582

Garden planning
flowers, choosing, 9/1255
landscaping, 9/1263
plants, choosing, 9/1273

Garnet
as abrasive, 1/25
sandpaper, 15/2260

Gas
heating system, 8/1151; 10/1406
lighting, for garden, 11/1582
refrigerant, 14/2121
service, availability of at homesite, 10/1400

Gas burner, clothes dryer, 20/3028

Gas cartridge gun, for paint sprayer, 14/2157

Gaskets
auto, application of, 7/982
auto engine manifold, 7/985
carburetor, 4/472
compound, 7/984
cylinder head, 9/1326
electric water heater, 9/1340
fuel pump, 8/1147
oil filter, 7/1052
radiator cylinder head, 5/691
refrigerator door, 14/2123
shower door, 16/2419
percolator, 5/629
toilet bowl, 6/847
transmission pan, 19/2850
vacuum cleaner, 20/2936
weakened, as cause of oil loss, 12/1744

Gasoline
choice of, for small engine, 7/1010
consumption, 1/157; 3/397; 4/469

economy, 1/157
filter, auto, 7/1051
high-test, 7/1010

Gas-operated camping equipment, maintenance of, 3/443

Gauges
auto dashboard, checking, 6/915
feeler, 19/2909; 20/2949
nonmagnetic feeler, 10/1436
pressure, for fuel pump, 7/1005
spark plug gap, 7/974
vacuum, 6/889; 7/1003
wind speed, 21/3087

Gate valve, plumbing, 7/1030; 14/2025

Gears
beater, in electric mixer, 11/1671
bicycle, 2/251, 259
reduction, 12/1804
worm, in electric mixer, 11/1671

General Prudential Rule, in boating, 12/1715

Generator
auto, 6/913; 13/1906
end plate, cleaning, 7/1002
in outboard motor, 7/964
photoelectric pulse, 21/3087
portable, rotary engine for, 15/2196
tone and chord, 18/2745

Geraniums, 8/1143

Germination of grass seed, 11/1580

Gesneriads, 8/1143

Gigahertz, defined, 7/950

LNA operation, 1/111

Glass
cutter, 3/351; 9/1289
cutting, 9/1289; 13/2007
double-pane for windows, 21/3110
for overhead projector, 14/2071
for shaving bar, 2/171
tinted to reduce solar heat, 5/681

Glass-ceramic, counters, 20/3004

Glassware
make your own, 3/351
in microwave cooking, 7/943

Glazed tiles, 18/2719

Glazing
acrylic sheet for, 17/2577
chisel, 4/569
compound, 9/1290; 21/3113
nonhardening compound, 17/2580
points, 12/1290; 21/3113
techniques, window glass, 9/1289

Glue
aliphatic resin, 1/39; 5/762
casein, 1/40; 5/760, 762; 13/1869
contact-type, 3/390
epoxy, 1/41; 2/180; 8/1199
gasket shellac, 7/988
gun, 1/42; 2/171; 8/1205; 17/2480
hot-melt resin, 1/42; 4/606
for inlays, 3/391
nonstaining white, 2/167; 10/1452
phenolic, 12/1705
plastic resin, 14/2113; 16/2367; 17/2518
polyester resin, 1/43; 8/1205
polyvinyl acetate, 1/43
resorcinol, 1/44; 2/306; 8/1199
types of, 1/39
urea, 13/1869
used with dowels, 6/836, 840
waterproof, 2/288; 4/484, 491; 5/758; 6/904; 10/1411
water-resistant, 3/354
white, 3/342; 4/598; 5/701, 749; 6/902; 8/1210; 16/2337; 18/2640
white plastic, 4/498

Go-cart
maintenance of, 7/1010
rotary engine for, 15/2196

Godetia, 9/1258

Golden trout, identifying, 8/1104

Goggles, 11/1548
how to use, 4/569
inside bevel, 4/571
in high relief carving, 4/502
sharpening, 16/2343, 2352, 2354
in wood carving, 4/496

Grafting, trees and shrubs, 9/1292

Grandfather's clock, 4/597

"Granny" knot, 10/1517

Grape hyacinth bulbs, planting, 8/1127

Grape vine, wild, 12/1789

Graphite, for lubrication, 11/1586

Grass, types of, 11/1573, 1579

Gravel
as coarse aggregate, 5/657
for concrete, 11/1644

Gravity-feed kit, for carburetor solvent, 4/469

Grease
in ball joint repair, 2/162
bicycle, 2/261, 263
in binoculars, 2/265
for boat trailer wheel bearings, 19/2811, 2821
in clogged sink drain, 6/842
for constant velocity joint, 1/151
silicone, 5/629; 6/790, 884; 21/3093
stains, removal of, 19/2932
for wheel bearings, 2/227

Greenhouse
fiberglass, 13/1886
freezing, security sensor, 10/1409
solar, 9/1296; 16/2453

Grill, charcoal, 12/1794

Grille cloth, 4/607; 17/2476, 2510, 2511, 1517

Grinder
on electric drill, 6/856
hand-held, choosing, 14/2054

Grinding wheel, 16/2346

Grooving
circular, with portable router, 15/2199
with dado assembly, 21/3155
with routing bit, 6/869
with saber saw, 15/2235
with wood shapers, 19/2797

Ground cover
in landscaping plan, 9/1265; 10/1533
masonry as, 17/2526

Grounding
of boat radiotelephone, 7/962
defective, in auto engine, 7/992
of dishwasher, 6/792
of power tools, 10/2768

Grout
dry mixture, for brick walk, 3/368
for formed stone walls, 17/2524

Grouting
in ceramic tiling, 2/201; 4/547
for fireplace tiles, 18/2724
mortar, for stone floor, 8/1146

Gunpowder
in reloading ammunition, 14/2128

Guns (pistol-gripped tools)
caulking, 2/188; 4/513, 609; 5/662
gas cartridge, for paint sprayer, 14/2157
glue, 1/42; 2/171; 8/1205; 17/2480
paint spray, 1/124; 12/1819, 1837
staple, 3/354; 4/518, 524; 5/763; 6/819; 8/1205; 17/2494

Guns (weapons): See also Shooting ammunition, making, 16/2381
cabinet for, 6/801; 17/2564
getting in shape, 16/2378
hand-loading ammunition for, 14/2132
improving accuracy of, 14/2133
improving marksmanship, 16/2386
recoil in, 16/2406
reloading ammunition for, 14/2128
shotgun pattern, 13/1926
skeet shooting, 16/2397
trapshooting, 16/2389
for wildfowl hunting, 10/1426

Gutters
checking for leaks, 11/1654
for home addition, 9/1390
painting, 12/1843
peeling of paint, 12/1829
repairing, 15/2183

Guy lines, elastic, for tent, 18/2706

- Gypsum
ceiling tiles, 4/522
wallboard, 5/720; 20/2984
Gypsy moth, destroying, 12/1755
- H**
- Half-hitch knot, 10/1511, 1518
Hammers, types of, 9/1316
Ham radio, crystal filters in, 7/954
Handbag, with flashing ornament, 5/706
Hand carving, 4/495, 501
Handbars
bicycle, 2/263
for jogging machine, 7/1019
for rowing machine, 7/1021
Handles
axe, 10/1508
calibrated, of radial arm saw, 14/2094
chisel, 4/500, 569
electric iron, 10/1471
hammer, replacing, 18/2767
knife, 10/1504
for motorized surfboard, 15/2210
for tool chests, 18/2760
tool, repairing, 18/2746
Handsaw
in boatbuilding, 2/306
choosing, 19/2782
how to use, 15/2277
sheath for, 18/2765
Hardboard
for built-in cabinet doors, 6/849
as furniture backing, 3/349
as house siding, 16/2426
for privacy panels, 3/353
wall panels, 13/1870
Hardware
antique, matching or duplicating, 3/394
in boat building, 2/293
computer, 5/654
drawer pulls, 3/394
for footlocker, 8/1165
for game table, 8/1215
garage-door, 8/1221
for modern desk, 8/1186
retrieving from used furniture, 8/1200
towel holders, 21/3116
for workshop desk, 21/3204
Hardwood
for boat construction, 2/285, 294
grading of, 11/1598
for jogging machine, 7/1014
parquet floor tiles, 8/1119
for rowing machine, 7/1021
sanding, 15/2261
simulated, for wall panels, 13/1870
for trays, 19/2860
Hatchet
lightweight, 10/1508
sharpening, 16/2344, 2353
types of, 9/1316
Headstock, of lathe, 11/1547
Heat
in molding plastic prints, 15/2311
oven, even distribution of, 7/931
security sensor against, 10/1407; 16/2327
wood paneling as insulator against, 13/1855
for workshop, 21/3199
Heater element
in clothes dryer, 20/3028
in percolator, 5/625
range, defective, 7/934
of steam iron, 10/1475
of toaster, 18/2733
in television tubes, 18/2693
of water heater, 9/1340
Heaters
auto, 6/913
defrost, 14/2125
dishwasher, 6/800
sauna bath, 15/2265
solar, 9/1296; 16/2453
for swimming pools, 18/2626
for tents, 17/2606
water, leaking, 14/2021
Heat gun, for curving plastic laminate, 10/1497
Heating system, home
in adding rooms, 9/1378
balancing hot water, 9/1342
chimney as part of, 4/558
choosing, 8/1151
convection, 8/1159
in garage conversion, 8/1235
hot air gas furnace, 9/1334
hot water, 8/1153; 9/1340; 14/2018; 16/2438
insulation, 9/1330; 10/1393
for new second story, 15/2172
reducing cost of, 9/1328
solar, 16/2453
water heater, 9/1340
wind-generated, 21/3102
wood-burning stoves, 17/2581
Heat pumps, 1/55; 8/1158
Heat riser, auto, 7/1007; 9/1347
Herb garden, raising, 9/1349
Hex inverter, in integrated circuit, 21/3088
Hex signs, as motif, 5/746
Hickory nut, shagbark, 12/1788
High fidelity speaker cabinet for, 8/1173
in grandfather's clock, 4/602
in intercom system, 10/1470
outdoor extension for, 17/2518
High fidelity system
in entertainment center, 8/1170
in room divider, 15/2192
servicing, 9/1355
Hiking
back pack for, 9/1363, 1366, 1370
cabinet for gear, 17/2564
emergency shelters, 17/2609
Hinges
on lower panels, 15/2194
ornamental, 3/391
for tray table, mortising, 19/2871
for workshop desk, 21/3204
Hinges, butt, 4/568
for Colonial hutch, 6/903
for desk cabinet, 8/1186
for drop-leaf coffee table, 18/2636
for sewing cabinet, 8/1177
for shutters, 16/2422
Hinges, cabinet, 3/350; 6/850
for bed storage unit, 17/2531
knife type, 3/388
offset, 6/805
pin, in laundry modules, 11/1570
Hinges, door
prepared with saber saw, 15/2234
repairing, 21/3106
shimming, 6/827
Hinges, piano
for buffet-wine cellar, 21/3115
for drop-leaf server, 16/2333
for hutch drop-leaf, 17/2540
Hitches
boat trailer, 19/2824
choosing, 19/2807
equalizing trailer, 19/2807, 2810
maintenance of, 3/445
for recreational vehicles, 3/397, 402
tying, 10/1516
Holes, drilling on lathe, 11/1547
Hole saw, for electric drill, 6/859
Home
additions: *See* Additions, home
air conditioning for, 1/51
alarms for, 1/70; 10/1465
central air conditioning, 1/52
cooling without air conditioning, 5/680
electrical system, analyzing, 6/924
factory-built, and noise quotient, 12/1735
insulation of, 10/1393
intercom system, 10/1464
mobile or motor, 3/396; 11/1677
new front for, 9/1372
planning additions, 1/32
sealing against weather, 4/513
security sensors, 10/1407
Home building
built-in intercom system, 10/1469
cutting initial costs, 10/1398
siding, choosing, 16/2425
Home improvement
acrylic shower door, 16/2419
adding a room, 9/1377
bathtub, enclosure for, 7/979
block screens, 5/667
ceiling tile, 4/517, 521
cupola, building, 5/714
doorbell installation, 6/822
door chimes installation, 6/815
dormer, building, 6/831
fireplace, installation of, 7/1080
gypsum panel walls, 20/2984
kitchen faucet, replacing, 7/1032
new front for house, 9/1372
partitions, 5/667
raising roof to enlarge house, 15/2163
safety tips, 15/2242
sauna bath installation, 15/2265
shutters, building, 16/2422
solar greenhouse, 9/1296
suspended ceiling installation, 4/527
swimming pool, choosing, 18/2625
wallpapering, 20/2993, 2996
window screens, making, 16/2317
wiring electrical, 21/3118
wooden patio deck, 5/728
wrought iron railings, 14/2118
Home ownership, cutting construction costs, 10/1398
Homesite
evaluating for landscaping, 9/1263; 10/1533
prospective, and noise, 12/1734
vacation, evaluating, 16/2437
Home Ventilating Institute, 20/2965
Home video, close look at equipment for, 20/2974
Hood fan, for kitchen range, 20/2966
Hood, metal, for fireplace draft, 7/1076
Hoppers, multi-sided, 10/1411
Horizontal hold, of TV picture, 5/633, 645; 18/2676, 2686
Horn switch, auto, 6/919
Hose
auto radiator, 5/684
garden, 7/995, 1001; 9/1295; 11/1644; 16/2416, 2438
vacuum, in power brakes, 6/889
Hot-melt resin glues, 1/42
House
painting exterior, 12/1832
painting interior, 12/1845
Hull, boat
choosing type, 10/1417
deep-vee, 2/299; 3/324, 332
fiberglass, 3/321
metal, 7/962
skidding in turns, 3/332
steel, painting, 11/1630
Hull support system, 19/2816
Humidity
basement, 2/182
control, in workshop, 21/3199
in fluorescent-light gardening, 8/1142
pollution in kitchen, 10/1484
in sauna bath, 15/2266
Humus, 9/1246; 12/1750
Hunting
ammunition, making, 16/2381
cabinet for gear, 17/2564
decoys for, 5/754, 757
dove, 10/1426
duck, 10/1423
getting gun in shape, 16/2378
knives and axes for, 10/1502
off-season target practice, 16/2415
and quicksand, 14/2085
retrieving game, 10/1419

shotgun chokes in, 16/2411
 shot sizes for, 16/2414
 skiff for, building, 16/2442
 waterfowl, blinds for, 6/891;
 10/1423, 1426
Hutch
 Colonial, 6/900
 for small appliances, 17/2537
 Hyacinths, 8/1126, 1130; 9/1259
Hydraulic
 brakes, auto, 10/1430
 fluid, in power brakes, 6/887
 jack, 2/232; 7/1051
 line, in drum brakes, 6/878
 pressure, in power steering, 14/2048
 theory, 10/1430
Hydrochloric acid
 in furniture refinishing, 7/1059
 to remove efflorescence, 11/1655
Hydrofoil, mini-, 14/2086
Hydrometer
 in checking antifreeze, 5/684
 in testing auto starter, 7/989
 in testing battery, 2/212
Hygrometer, in weather forecasting,
 20/3068
Hypersensitivity, to insect bites,
 13/1936
Hyperventilation, 17/2619
Hypothermia, avoid in camping,
 17/2604

I

Ice chest, for camping, 3/414
Ice cream stains, removal of, 19/2932
"icing" of carburetor, 4/483
Identification
 of fishing catch, 8/1100
 of personal tools, 9/1304
 of sea shells, 16/2364
Ignition points, auto, installing in
tune-up, 19/2906
Ignition system, auto
 advance tester, 7/967
 care of, 7/1000
 checking, 7/1007
 coil winding, 10/1433
 electronic, 10/1434
 operation of, 10/1433
 servicing, 10/1434
 testing, 4/469
 timing, 13/1905
 Wankel engine, 19/2921
 wiring, 13/1913
Ignition system, boat, 2/311
 checking for spring, 11/1632
 inspect before storage, 17/2560
Ignition system, chain saw, 11/1642
Ignition system, mini rotary engine,
 15/2196
Ignition timing retarder ("vacuum
chopper"), 1/116
Illumination, kitchen, 10/1438
Image, in strobe action, 17/2593
Impatiens, 9/1259
Inboard motor, flush before storage,
 17/2560
Inboard motor boat
 handling, 6/808
 mini-hydrofoil, 14/2086
Inboard-outboard motors, propeller
 action, 3/316
Incandescent lights
 dimmers for, 6/780
 vs. fluorescent, 10/1440
Incase
 in air cannon, 15/2280
 for smoke box optical bench,
 15/2309
India stone, 10/1506
Indicator unit, for anemometer,
 21/3096
Inductance, electric, 6/923
Inductance (resonant circuits), 7/953
Infants, photographing, 13/1962, 1964
Inflation pressure, tires, 18/2729
Inking, of linoleum prints, 14/2050

Inland Rules, for vessels in coastal
waters, 12/1711
Inlay woodworking
 decorative, 10/1458
 with fly-cutter, 19/2795
 with portable router, 15/2200
 ready-made, 3/390; 10/1459
 turnings, decorative, 10/1452
 veneer pictures, 10/1446
Inlet valve, toilet, 18/2740
Input, laser beam system, 10/1545
Insecticides, in fertilizer, 7/1050
Insects
 coping with, 13/1931
 used as pesticides, 12/1754; 13/1931
Insect stings, emergency treatment,
 8/1091
Insulation
 and air conditioning, 1/55
 of aluminum house siding, 16/2432
 in attic remodeling, 1/35, 140
 of basement, 2/186
 boards, 2/186; 9/1329; 10/1405
 in boat engine, 2/314
 double-pane windows, 21/3110
 of electrical wire, 17/2482; 21/3131
 facts to know, 10/1393
 fiberglass, 10/1395; 17/2475
 of floor, in home addition, 9/1385
 for home heating and cooling,
 5/681; 9/1328
 in home heating economy, 8/1156
 installation, 10/1393; 17/2494
 for new second story, 15/2173
 for sauna bath, 15/2266
 types of, 9/1329; 10/1394
 for vans, 20/2961
 weatherstripping, 4/613; 5/681;
 6/829
Intake manifold, auto, 4/471, 578
 gasket for, 7/986; 12/1744
 and power brakes, 6/888
 tightening, 9/1326
 vacuum gauge connected to, 20/2937
 vacuum, testing, 7/1004
Integrid suspended ceiling hardware,
 4/527
Intercom system, home, 10/1464
Interference
 in intercom system, 10/1465
 in radiotelephone, 7/960
Interocular scaling, 13/1979
Intruders, security sensors against,
 10/1407
Ion trap magnet, in TV adjustment,
 18/2685
Irish moss, in landscaping plan,
 9/1265
Iron
 in fertilizer, 7/1050
 keep compass away from, 12/1724
 legs, for coffee table, 8/1168
 trim, ornamental, 9/1374
 ironing equipment, placement of,
 11/1566
Irons, steam or dry, repairing,
 10/1471
Irrigation, garden subsoil, 9/1249
Ivy, in landscaping plan, 9/1265

J

Jack, hydraulic, 2/232; 7/1001, 1051
Jam knot, 10/1511
Jars
 removing top or bottom, 9/1293
 sources of, 9/1295
Jewelry, flashing, 5/706
Jigs
 for back-to-back dadoing, 21/3156
 in boat building, 2/288
 cutting, 3/351; 10/1476
 dovetailing, 15/2207
 dovetail, 6/837
 lathe, for duplicating shapes,
 11/1559
 for machine molding, 21/3167

miter-gauge, for duplicate rabbeting,
 21/3156
table saw, 10/1476
Jig saw, 6/805
acrylic sheet cutting, 14/2009;
 17/2580
curve cutting, 3/384; 4/594; 7/1020;
 9/1366; 16/2331; 17/2480
 on electric drill, 6/856
 on electric veneer pictures, 10/1446
 reciprocating, 8/1208
 for scallop cutting, 6/895
Jogging machine
 building, 7/1014
 pedometer for, 7/1017
Jointer
 for rabbeting, 4/561
 with table saw, 18/2654
Joining
 compound, for gypsum panels,
 20/2988
 on table saw, 19/2804
 techniques of, 21/3152
 with wood shapers, 19/2797
Joints
 in brick walls, cleaning, 11/1656
 butt, 2/282, 296, 306; 3/339, 370;
 4/502; 6/851, 894, 902; 21/3157
 cabin-to-deck, 3/322
 column, 10/1411
 concave, in bricklaying, 3/361
 corner, in boat, 3/322
 dado, 21/3157
 dovetail, 21/3157
 doweled, machine-bored, 6/865
 drywall, finishing, 2/187
 fastening with dowels, 6/837
 flush, in bricklaying, 3/361
 glued, 21/3157, 3171
 gypsum paneling, taping of, 20/2988
 lap, 8/1195; 21/3157
 lock, 10/1411
 making, with table saw, 18/2654
 miter, 4/597; 10/1476; 21/3157
 mortise-and-tenon, 6/850; 15/2207;
 16/2367; 21/3157
 rabbeted, 10/1414; 21/3157
 raked, in bricklaying, 3/361
 roof, sealing, 3/358
 scarf, 2/282
 struck, in bricklaying, 3/361
 tenon, for loom, 11/1591
 tongue-and-groove, 21/3157
 types of, 10/1411, 1414; 21/3157
 "V," in bricklaying, 3/361
 weather, in bricklaying, 3/361
 for window screens, 16/2317
Joists, ceiling
 checking for new second story,
 15/2165
 locating, 4/523, 527; 6/831
 preassembly of, dormer, 6/834
 spacing for plywood squares,
 13/1865
Joists, floor
 in garage conversion, 8/1234
 for little red barn, 9/1284
Joists, roof
 for boat storage port, 17/2555
Jonquil, 8/1130
Jumper cables, 2/216
Jumper wire
 in testing auto regulator, 6/917
 in testing auto starter, 7/991
 in testing gas furnace electric
 circuit, 9/1336
Jumping, in water skiing, 20/3038
Juniper, for bonsai trees, 3/334
Juniper, creeping, in landscaping
plan, 9/1265

K

Keel
 in boat building, 2/288, 294
 in sailing, 15/2255
Kentucky bluegrass, 11/1573, 1580
Kerosene, in cleaning auto engine,
 4/476; 7/1002

- Key**
 duplication of, 11/1589
 paracentric, 11/1587
Keyboard, computer, 5/655
Kilocycle, defined, 7/948
Kilohertz, defined, 7/948
Kilohm, defined, 7/949
Kilowatt hour, 6/923; 8/1155
Kinescope, 5/642
King salmon, identifying, 8/1105
Kits
 antiquing, 5/762
 auto security sensor, 10/1407
 auto timing lights, 7/968
 bathtub enclosure, 7/979
 bottle-cutting, 3/351
 for brake overhaul, 6/882
 carburetor rebuilding, 4/472
 color generator, TV, 5/631
 engine analyzer, auto, 7/969
 first aid, for camping, 8/1088
 flushing auto cooling system, 5/692
 for four-barrel carburetor, 4/476
 fuel pump repair, 8/1150
 gravity-feed, for carburetor solvent, 4/469
 home security sensors, 10/1409
 ignition analyzer, 7/971
 for inlaid veneer pictures, 10/1446
 in-line gasoline filter, 7/1053
 laser voice-transmission system, 10/1542
 loom, table-top, 11/1590
 for marbleizing plywood table top, 12/1816
 metal patch, for painting auto, 12/1820
 for plaque framing, 5/705
 repairing auto dents and rust-outs, 14/2151
 silicon solar cell, 5/650
 sleeping bag, 3/447
 snakebite treatment, 16/2451
 soil-testing, 11/1575
 solderless electric connections, 6/920
 for specialized tools, 9/1303
 suppression of boat radio static, 7/960
 surfboard repair, 17/2601
 swimming-pool water test, 18/2629
 vinyl auto upholstery repair, 19/2928
Kitchen
 appliances, arranging, 10/1489
 appliances, repair, 1/126
 auxiliary cooking center in hutch, 17/2537
 counter decorations, 20/3004
 ecological, planning, 10/1481
 extra storage for, 17/2534
 faucet, replacing, 7/1032
 laundry equipment in, 11/1564
 lighting, planning, 10/1438
 L-shaped, 10/1482, 1489
 painting with enamel, 12/1852
 paper dispenser, 13/1891
 plasterboard panels for, 20/2992
 plastic laminate surfaces for, 10/1496
 sink, replacing, 10/1500
 spice racks, 17/2478
 tools in the wilderness, 5/709
 U-shaped, 10/1402
 ventilation by fan, 20/2965
 wall materials, 20/3006
Knife
 choosing, 10/1502
 curved, 4/496
 fiberboard, in ceiling tile installation, 4/524
 linoleum, 8/1117, 1122; 14/2097
 maintaining, 10/1502
 sharpening, 10/1505; 16/2341, 2346, 2353
 woodcarver's, 4/495
Knots
 in lashing tent or bedroll, 3/440
 in lumber, 11/1595
 tying, 10/1511, 1516
 Underwriters', in wire splicing, 21/3126
Kokanee salmon, identifying, 8/1105
- L**
- Ladders**
 for bunk beds, 2/239
 for exterior house painting, 12/1836
 for the home, 10/1519
 to reach drowning victim, 15/2248
 for swimming pool, 18/2627
Lake trout, identifying, 8/1104
Laminated counter, preparation for
 tiling, 4/542
Lamp base
 of inlaid wood turnings, 10/1452
 of staved construction, 10/1413
Lamppost, for lawn, 12/1765
Lamps
 dimmers for, 6/777
 fluorescent, 6/923
 rewiring, 21/3126
 spring pole, 13/1901
Land-sailer, building, 10/1526
Landscaping, 9/1263; 10/1533
 blending swimming pool with, 18/2625
 helpful rules for, 10/1539
 lawn, choosing and maintaining, 11/1573
 patio design, 13/1919
 possibilities on new homesite, 10/1400
Language, computer, 5/653
Lantern, camp, 3/416, 442
Lasers, 5/647; 10/1542
Lashings, tying, 10/1516
Latches
 garage-door mechanism, 8/1218
 how to free sticking, 6/827
Latex
 caulking compounds, 4/514
 cement, 5/663
Lathe
 on electric drill, 6/856, 906
 for inlay work, 10/1459
 lubrication of, 11/1547
 for picture frames, 13/1999
 wood-turning, 11/1547
Lathe accessories
 faceplate, 11/1550
 headstock brake, 10/1547
 jig for duplicating shapes, 11/1559
Laths, buying, 11/1596
Latitude, determining, 6/783
Laundry rooms
 basement in new home planning, 10/1403
 modular, 11/1567
 planning, 11/1563
 plasterboard panels for, 20/2992
 ventilation by fan, 20/2973
Lawnmower
 blades, sharpening of, 16/2353
 maintenance of, 7/1010
 rotary engine for, 15/2196
Laws
 birdbath for, 12/1763
 choosing and maintaining, 11/1573
 eliminating moles from, 9/1241
 fertilizer for, 7/1048
 grass seed for, buying, 11/1579
 lamppost for, 12/1765
 mowing, 11/1574
 swing for, 8/1191
 watering, 9/1248
 wishing well for, 12/1759
Lazy Susan, wood, making, 19/2860
Lead
 in skeet shooting, 16/2405
 in trapshooting, 16/2392
Leaf skimmer, for swimming pool, 18/2627
Leaks
 auto oil, 12/1743
 chimney, 7/1076
 gasoline, in fuel pump, 8/1147
 in masonry walls, 11/1654
 oil, in fuel pump, 8/1147
 of wheel bearings, 6/879
Leather, auto upholstery, 19/2928
Lectern bookcase, 3/344
Legs
 assembly for modern desk, 8/1186
 electric range, leveling of, 7/931
 hinged, for tailgate van extension, 3/406
 iron, for coffee table, 8/1168
 ready-made, 3/393; 8/1211; 18/2634
 self-leveling, on metal furniture, 8/1199
 tapered, for patio table, 8/1195
 used furniture, repairing, 8/1199
 wrought iron, for table, 18/2641
Lens
 bifocal, 2/265
 cleaning fluid for, 3/437
 close-up, camera, 3/434
 convex, 5/649
 objective, of binoculars, 2/264
 opening, 13/1937
 for overhead projector, 14/2075
 for smoke box optical bench, 15/2306
 for Schlieren optics, 15/2295
 telephoto, 13/1949
 view operation of, 15/2302
 wide-angle, 13/1950
Lettering, relief, with routing bit, 6/869
Leveler, T-nut, for pool table, 14/2026, 2046
Levels, types of, 9/1311
Library wall cabinet, 3/370
Life jackets, 11/1633
Life preservers
 for accident victims, 14/2241
 check, in sailing, 15/2257
Lifesaving
 breaststroke used in, 17/2618
 quick surface dive used in, 17/2623
Light
 for indoor gardening, 8/1141
 inductive pickup, 7/968
 infrared, 5/647
 for Schlieren optics, 15/2294
 stroboscopic, 7/967
 test, in snaking wires, 4/587
Light emitting diode (LED)
 as flashing device, 5/706
 in optical communication, 5/647
Lighting
 in adjusting color TV picture, 5/634
 for air cannon experiments, 15/2283
 back, in photography, 13/1954
 fixtures, permanent, 6/777
 in photomicrography, 13/1976
 of picture frame, 13/2006
 system, auto, 6/912
Light lists, navigational, 12/1718
Light meter, camera, 13/1939, 1950
Lightning arrester
 for rooftop antenna, 1/108
Lights
 auto, 6/913
 for boat trailer, 19/2816, 2827
 dimmers for, 6/777; 10/1444
 fluorescent; *See* Fluorescent lights
 for garden, 11/1582
 indicator, 20/3011
 kitchen, 10/1438, 1487
 pilot, 20/3010
 underwater, for swimming pool, 18/2627
 switches, 6/926
 wiring; *See* Wiring, electrical
Light sensor
 burglar alarm, 1/80
 for laser beam voice transmission, 10/1545
Light waves, communication by, 5/647
Lightweight
 aircraft, 1/64
 bicycles, 10-speed, 2/259

Lily, 9/1259
 Lily-flowered tulips, 8/1129
 Lime
 in mixing mortar, 3/360
 to neutralize soil, 11/1575
 in water, 6/791
 Linoleum
 for kitchen counters, 20/3004
 metal edgings for, 21/3151
 plywood base on counters, 21/3150
 prints, making, 14/2066
 for workbench surface, 21/3182
 Linseed oil
 in furniture refinishing, 7/1061
 as wood finish, 4/498, 7/1071
 LNA: See Low noise amplifier
 Load capacity, boat, 3/330
 Load range, of auto tires, 18/2728
 Locks
 defective, 21/3107
 repairing, 11/1586
 Logs, splitting, 8/1085
 Loom table-top, 11/1590
 Loudspeakers
 AC/DC ratio, defective, 9/1357
 experimenting with, 15/2286
 Louvers
 fence, building, 9/1372
 in fluorescent lights, 10/1442
 in room dividers, 15/2192
 Low noise amplifier, 1/111, 113-115
 Low relief carving, 4/497
 Lubrication
 boat engine, 2/314
 boat-launching trailer, 19/2821, 2824
 garage-door pivot points, 8/1221
 of lathe, 11/1547
 for oilstone use, 16/2341
 for tape recorder, 18/2656
 Lubrication system, auto, care of, 7/1000
 Luggage rack, car top, 4/484
 Lumber
 for boat building, 2/281
 buying right grade, 11/1595
 for cedar closet, 4/609
 for child's foodcaker, 8/1163
 for dormer, 6/833
 furniture, from crates, 11/1605
 scrap, "antiques" from, 11/1602
 screen stock, 16/2317
 secondhand, 5/762
 sizes of, 11/1598
 storage for, 11/1611
 for two-place chaise, 4/553
 Lures, fishing, 8/1099
 Bass bugs, tying, 2/189
 Flies, tying, 2/189
 Knots for tying to line, 10/1511
 Overhauling, 11/1615
 In trolling, 19/2886
 For trout, 19/2897

M

MacPherson strut, front-wheel drive, 1/150, 152
 Macrophotography, 11/1620
 Magnetic field
 in auto ignition system, 10/1433
 in color TV, 5/631
 in electronic ignition system, 10/1435
 Magnification
 in macrophotography, 11/1624
 in photomicrography, 13/1975
 Mahogany
 for chessboard squares, 8/1213
 for paddleboard, 2/308
 Mallet
 use with chisel, 4/569
 in wood carving, 4/496, 502
 Manifold
 intake, auto, 4/471, 483, 578
 intake and exhaust gaskets, 7/985
 vacuum, 4/480

Manure
 as aid in compost pile, 9/1246
 as fertilizer, 12/1750
 as soil conditioner, 11/1575
 Marble
 effect in antiquing, 1/125
 for kitchen counters, 20/3004
 simulated, 2/206; 12/1816; 13/1871
 for stone foyer, 8/1144
 Marigold, 9/1260
 Marigolds, marsh, 12/1788
 Marksmanship
 gauging, 16/2380
 improving, 16/2386
 Marquetry, 10/1452, 1458
 Mask, for snorkeling 16/2319
 Masking tape
 as aid in molding installation, 4/605
 in cutting acrylic sheet, 8/1209
 as depth gauge on chisel, 4/497
 in gluing, instead of clamps, 2/167; 3/343
 in painting auto, 12/1819
 in tracing linoleum prints, 14/2050
 Masonry: See also Concrete
 adhesive for repair of, 1/42
 barbecue, back yard, 2/164
 building with stone, 17/2521
 concrete home improvements, 11/1643
 curbs, edging, and ground cover, 17/2525
 drill, 6/820
 drill bit for, 3/355
 house facings, 16/2432
 insulating, 2/186
 leak repair, 2/180; 11/1654
 preparing for painting, 12/1813, 1841
 removing smoke stains, 7/1077
 repairing, 5/662
 retaining wall, building, 17/2527
 saw blade for, 19/2782
 walls, installing paneling on, 13/1861
 Masonry tools
 drills, 9/1310
 types of, 9/1320
 Master cylinder
 of drum brakes, 6/876
 in hydraulic brakes, 10/1430
 Mastic
 adhesive, for imitation stone wall covering, 20/3002
 for attaching insulating board, 2/187
 in bathroom paneling, 2/207
 for building block screens and partitions, 5/667
 for ceramic tile, 8/1146
 for sealing cupola flashing, 5/716
 for weatherproofing roof joints, 3/359
 Measure
 electronic unit of, 7/948
 of nails, 12/1707
 unit of, in lumber, 11/1599
 Medium-edged tools, sharpening, 16/2343
 Meeting situation, in boating, rules for, 12/1713
 Megger, defined, 7/950
 Megohm, defined, 7/948
 Memory, computer, 5/655
 Mendel tulips, 8/1129
 Meniscus lenses, for overhead projector, 14/2070
 Metal
 cutting with saber saw, 15/2233
 for fences, 7/1037
 flashing, for roof, 9/1390
 furniture used, 8/1199
 housing for directional microphone, 11/1660
 ladders, 10/1520
 preparing for painting, 12/1813
 primer for, 2/275
 sanding, 15/2262
 saw blade for, 19/2782

tank, for portable shower, 16/2416
 valve, galling of, 7/995
 wheelbarrow, in masonry, 3/360
 Metalworking
 abrasives for, 1/25
 adhesives for, 1/39
 Meters
 exposure, 13/1947, 1977
 electric, 4/584; 6/923
 light, for camera, 13/1939, 1950
 Mickey-mike (micromicrofarad), 7/950
 Microampere, defined, 7/948
 Microfarad, defined, 7/948
 Micromicrofarad, defined, 7/950
 Microphone
 in cassette player, 4/508
 for CB radio, 4/590
 directional, 11/1658, 1665
 parabolic, 11/1665
 piezoelectric, 7/953
 in public address system, 14/2079
 Microphone jack
 in cassette player, 4/508
 in optical communications, 5/649
 Microscope
 electronic flash photos, 13/1983
 photography through, 13/1972
 Microwave
 burglar alarm, 1/72
 oven, 7/942
 and satellite antenna, 1/115
 Mike (microfarad), 7/950
 Mildew
 on paint, 12/1827
 stains, removal of, 19/2932
 Mileage, gasoline
 auto, 1/157; 4/469; 7/982, 1008
 in recreational vehicles, 3/397
 Milliampere, defined, 7/948
 Mineral fiber ceiling tiles, 4/522
 Mineral wool, as insulator, 9/1329
 Mini-beacon, for locating auto, 7/973
 Minibike
 buying, 11/1668
 maintenance of, 7/1010
 rotary engine for, 15/2196
 Minicycle, 11/1668
 Mini-hydrofoil, 14/2086
 Mini motor homes, 3/404
 Mini-workshop, 18/2753
 Mirror
 for color TV adjustment, 5/633
 for console cabinet, 3/376
 panel for shaving bar, 2/173
 in photomicrography, 13/1988
 for Schlieren optics, 15/2296
 side-view, for trailer, 19/2810
 theatrical vanity, 20/2957
 wall shelves backed with, 16/2365
 for whatnot shelves, 4/505
 Miter
 blade, 19/2784
 box, 1/90; 2/206; 8/1122; 10/1459; 12/1702
 joints, cutting, 10/1476
 lock, 10/1415
 Miter gauge, 4/564; 8/1212
 in building console cabinet, 3/376
 crosscutting with table saw, 18/2652
 extension, for table saw, 10/1479
 in mounting hinges, 3/375
 Mitering
 with circular saw, 18/2769
 compound setups, 10/1411
 crown molding, 17/2513
 with radial arm saw, 14/2093
 with saber saw, 15/2235
 with table saw, 18/2651
 with wood shaper, 19/2797
 Mobile home, 3/396; 11/1677
 Air conditioners, 1/55
 buying, 11/1677
 checklist, 11/1685
 choosing site for, 11/1682
 exterior accessories, 11/1691
 finishing, 11/1690
 precautions in buying, 11/1685
 value comparison, 11/1680

Model building carving tools, 4/572
 Model car hideaway track, 11/1694
 Models, photographic, 13/1959
 Modulation, frequency, 7/957
 Modulator, transmission, replacing, 19/2852
 Molding head cutter
 in circular saw, 21/3203
 in table saw, 19/2804
 Moldings
 astragal, 6/851; 12/1703
 band, 12/1703
 beveled, 12/1703
 boat interior, checking, 3/322
 buited, 12/1701
 buying, 11/1599
 carved, 4/502
 ceiling, in installing wall paneling, 13/1861
 corner, to conceal joints, 10/1413
 cove, prefinished, 2/166; 8/1122; 15/2191
 crown, 3/376; 12/1705; 17/2513
 decorative, 3/384; 5/771; 6/851, 900; 12/1703; 16/2340; 17/2511
 edge, 12/1701; 21/3167
 embossed, 18/2638; 19/2793
 face, 21/3170
 flute, 12/1703
 with fly-cutter, 19/2793
 half-round, 12/1701
 machined, 21/3167
 for paneled walls, 13/1873
 prefinished, 3/339, 370, 376
 reveal, 12/1702
 in roof repair, 15/2191
 scalloped, 19/2794
 snap-in, for bathtub enclosure, 7/980
 strip-cut, 19/2792
 surface, 12/1704
 for suspended ceiling, 4/527
 with table saw, 18/2654
 uses of, 12/1701
 vinyl, 8/1122
 Molds, eliminating from lawn, 9/1241
 Monel wire lines, trolling, 19/2886
 Monocoque construction, for travel trailer, 3/399
 Monocular microscope, 13/1972
 Monofilament lines, trolling, 19/2886
 Morel mushroom, 12/1787
 Mortar
 as base for stone walls, 17/2521
 for concrete blocks, 9/1381
 lightweight concrete, 5/676
 mixing, 3/360
 for tile-setting, 18/2721
 tuckpointing, 11/1656
 uses of, 5/657
 for a wet retaining wall, 17/2529
 Mortise lock, 11/1587
 Mortises
 chisels for cutting, 4/571
 with radial arm saw, 14/2100
 with routing bit, 6/869
 Mosaics, ceramic, 18/2719
 Fireplace preparation, 18/2720
 Motion detector alarm, 1/71, 72
 Motor
 clothes dryer, 20/3028
 dishwasher, 6/800
 electric drill, 6/857
 electric mixer, 11/1671
 mount for overhead projector, 14/2075
 outboard: *See* Outboard motor of radial arm saw, as general power source, 14/2094
 series type, in blender, 2/276
 sizes in minibikes, 11/1668
 for strobe unit, 17/2589
 washing machine, 20/3022
 Motorcycle
 little red barn as garage for, 9/1280
 rotary engine for, 15/2196
 Motor home, 3/404. *See also* Mobile home

Mud room, 10/1487
 Muffler
 auto, 7/1009; 13/1913
 minibike, 11/1670
 Mulch
 for fall-planted bulbs, 8/1133; 9/1245
 as ground cover, 10/1540
 for newly sown lawn, 11/1575
 wood, 12/1749
 Multiflowered tulips, 8/1129
 Multivibrator
 in anemometer, 21/3088
 music box, 18/2745
 Muriatic acid
 in cleaning stone floor, 8/1146
 to remove efflorescence, 11/1655
 to remove smoke stains, 7/1079
 swimming pool pH balance, 18/2633
 Mushrooms, wild, 12/1787
 Music, stock value, 18/2749

N

Nail knot, 10/1511
 Nails
 aluminum, for child's raft, 14/2115
 buying and using, 12/1707
 countersinking, 4/484, 597, 609; 5/739
 diameter of, 12/1707
 for gypsum wall paneling, 20/2986
 roofing, 15/2183
 shingle, 12/1707
 and yarn on wall plaques, 5/704
 Nailsets, types of, 9/1317
 Nanoampere, defined, 7/950
 Narcissus, 8/1130
 National Association of Skin Diving Schools, 16/2319
 National Association of Underwater Instructors, 16/2319
 National Maritime Manufacturers' Association, 3/322, 330
 National Oak Flooring Manufacturers' Association, 11/1598
 National Weather Service, 3/428; 9/1330
 Naugahyde, auto upholstery, recoloring, 19/2928
 Nautolex, as deck covering, 2/307
 Navigation
 folk, 12/1730
 "rules of the road," 12/1711
 sailing for beginners, 15/2254
 steering by compass, 12/1722
 Navigational charts, for fishing, 19/2886
 Needle-nose pliers, 4/473
 Neoprene
 adhesives, 1/42; 2/208
 caulking compound, 4/514
 for gaskets, 7/987
 washer, faucet, 7/1028
 Nickel-cadmium battery, 2/220
 Night light, 20/3011
 Noise
 in auto, 7/994; 14/2142
 in bathroom laundry problem, 11/1563
 in cassette player, 4/509
 in heating system radiators, 9/1346
 and homesite, 12/1734
 level in home, 4/521; 6/819
 minibike problem, 11/1670
 modulation, in tape player, 18/2664
 plumbing, tracing, 14/2024
 as pollution in kitchen, 10/1484
 in tape player, 18/2662
 wood paneling as insulator against, 13/1855
 Noise Exposure Forecast (NEF), 12/1736
 Northern exposure
 in landscaping, 10/1534
 in patio design, 13/1922
 North Star, in direction finding, 6/782; 12/1730

Nozzles
 for paint sprayers, 14/2157
 water, for garden, 9/1249
 Nutrients
 plant, water-supplied, 9/1248
 for soil, 11/1575; 12/1750
 Nylon
 bearings, jogging machine, 7/1014
 in bias-ply tires, 18/2726
 pack sack, 9/1363
 paintbrush, 12/1808
 poncho, for back pack, 9/1364
 rip-stop, for sleeping bag, 3/448
 rope, 9/1366; 10/1516; 11/1634
 safety line, for child's raft, 14/2117
 of tent, repairing, 18/2710

O

Ohm, defined, 6/923
 Ohmmeter, as testing device, 1/88, 135; 4/508; 5/630; 7/948, 967; 9/1356; 10/1436, 1471
 Ohm's Law, 6/923; 7/948
 Oil
 additives, 2/230; 7/989; 12/1747
 auto engine, changing, 7/1003
 bench stone lubricant, 16/2347
 bicycle cable and chain, 2/259
 in blender repair, 2/278
 chain saw filter, 11/1639
 crankcase, auto, 4/580; 5/691; 7/997
 in diesel engine, 1/160
 dirty, auto, 12/1745
 filter, auto, 7/1051
 grades of, 7/1010
 heavy, auto, 7/989
 home heating system, 8/1151; 10/1406
 for lining concrete forms, 5/677
 loss of, auto, 12/1743
 oilstone lubricant, 16/2352
 outboard motor, 12/1772
 in small engines, 7/1012
 soaking plunger seal, auto, 4/473
 for tape player bearings, 4/511
 transmission level, 12/1744
 valve, auto, 7/994
 Oil/gas fuel, in minibike, 11/1669
 Oil pan
 in changing bearings, 2/232
 gasket for, 7/986
 tightening plug, in oil loss, 12/1744
 Oil pump
 in power steering, 14/2048
 Oil rings, 12/1746
 Oil stains
 removal of, 19/2932
 in wood finishing, 7/1067; 17/2488
 for wood floors, 8/1109
 Oilstone
 for chisel edge, 4/500
 honing, 16/2352
 lubrication of, 16/2352
 types of, 16/2341
 Omnidirectional speaker, 17/2499; 2511
 Onion butter, recipe, 12/1793
 Onions
 for vegetable garden, 9/1242
 wild, 12/1789
 Open end wrench, 7/1003; 17/2377
 Optical bench
 Schlieren, 15/2293
 smoke box, 15/2302
 Optical communications, 5/647
 Optics
 Schlieren, 15/2292
 3-D, 13/1972
 Optolinear, in burglar alarm, 1/80
 Orbital sander, 1/30; 7/1064
 choosing, 14/2054
 for stereo speakers, 17/2512
 Orchids, for fluorescent-light gardening, 8/1143
 Organic gardening, 9/1241; 12/1748
 Ornaments, lawn
 bench, 12/1764
 birdbath, 3/368; 12/1763

garden cart planter, 4/491
 lamppost, 12/1765
 wishing well, 12/1759
Oscillator
 code practice, 14/2112
 Colpitts crystal, 7/959
 crystal ground for specific, 7/957
 grid-plate, 7/959
 sine wave, 18/2745
 tubes, television, 18/2673, 2676
 unijunction transistor, 16/2327
Oscilloscope, ignition, 7/970;
 10/1437
Outboard Boating Club of America,
 12/1720
Outboard boats, 15/2221
 Deep-vee Sea Angler, 2/299
 handling, 6/808
 launching trailer for, 3/324
 lightweight skiff, 16/2442
 radiotelephone on, 7/960
 rotary engine for, 15/2196
 running lights of, 12/1718
 testing, 3/330
Outboard motor
 for canoe, 12/1777
 choosing, 12/1770
 clean for spring season, 11/1634
 with coil-battery ignition, 7/964
 ignition system, 7/960
 maintenance of, 7/1010; 12/1772
 oil, 7/1012
 propeller action, 3/316
 remove for storage, 17/2559
 for skiff, 16/2442
Outdoor life
 campsite cooking, 12/1792
 factor in landscaping plan, 9/1264
 patio design for, 13/1919
 survival, 5/709; 6/782; 17/2604,
 2607, 2609
 wilderness foods, 12/1787
Outlet, electrical, as "coverup,"
 4/587
Outriggers, fishing with, 19/2891
Oven
 back pack, 12/1798
 built-in, placement of, 10/1492
 electric, adjustment of, 7/931
 fireless, 12/1782
 microwave, 7/942
 reflector, 12/1798
 wall, in new home planning,
 10/1403
Overdrive, auto, 6/913
Overhand knot, 10/1517
Owl brooch, with flashing device,
 5/706

P

Pack sack, 9/1363
Paddle-wheel boat, 12/1800
Pad paint applicator, 12/1850
Pads, abrasive, 1/28
Pad sander
 choosing, 14/2060
 how to use, 15/2259
Paint
 acrylic, 6/910; 8/1210; 14/2012
 aerosol, 4/492; 12/1854; 14/2012;
 2154
 aluminum, 21/3142
 antifouling, 11/1628
 auto, 12/1819; 14/2151
 on basement insulation, 2/187
 boat, 1/103; 2/287; 11/1628, 1630
 buttermilk, 8/1206
 casein, for wall plaque, 5/703
 cement bonding, 2/184
 for concrete floor, 8/1110
 darkroom light seal, 5/720
 enamel, 5/745; 8/1100, 1110
 epoxy, for gutters, 12/1843
 estimating requirements for,
 12/1806
 exterior, 4/492; 12/1842
 fluorescent, 12/1842

interior, choosing, 12/1852
 for kitchen walls, 20/3006
 masonry, 5/667
 nonlead for nursery, 12/1852
 sand, 12/1853
 spray, 8/1210; 12/1854; 14/2156
 vinyl, 11/1630
 waterproof, for basement, 2/180
 for wood floor, 8/1100
Paintbrushes, 12/1807
 artists', 5/745
 for epoxy concrete, 8/1146
 for exterior house painting,
 12/1836
 in furniture refinishing, 7/1060
 for stain application, 17/2491
 stippling, 12/1853
 for wall plaque, 5/703
Painting
 with aerosol can, 12/1854
 in attic remodeling, 1/146
 auto, 12/1819
 in boat building, 2/292
 cupola, 5/716
 door, 6/830
 with dyes, 12/1815
 exposed plywood edges, 2/248
 failures in, 11/1630
 house exterior, 12/1832
 house interior, 12/1845
 marbleizing plywood, 12/1816
 paddleboard, 2/310
 perforated ceiling tiles, 4/522
 preparing surfaces for, 12/1813
 problem-solving, 12/1827
 screen panels for patio, 3/354
 technique with spray gun, 14/2160
 tools for, 12/1807, 1840
 wall plaque, 5/702
 paint pads, 12/1807
Paint primers
 for auto retouching, 14/2155
 in boat repainting, 11/1628
 for exterior fixtures, 12/1842
 for fiberglass, 11/1630
 for metal, 2/275
 in refinishing wood floor, 8/1106
 in wood finishing, 7/1058, 1068
Paint removal, 16/2458
 with pad sander, 15/2259
 in refinishing, 8/1205, 1206
 remover, 7/1058; 8/1106; 16/2458
 water-base, 16/2458
Paint rollers, 12/1807
 with extension handle, 8/1110
 short-nap mohair, 2/206
 use of, 2/183
Paint scraper, 9/1309
 in furniture refinishing, 7/1058
Paint stains, removal of, 19/2932
Panel board, electric, 6/925
Panels
 asphalt-saturated fiber, 6/834
 in basement finishing, 2/180
 for bathroom walls, 2/204
 for boat, 2/281
 carved, 4/501
 cutting with power saw, 18/2649
 decorative plastic, 2/178
 door, 3/353, 370; 4/504; 6/829, 830
 fiberglass, 13/1855
 fruitwood, for cabinet bar, 2/166
 for furniture doors, 6/850
 in garage conversion, 8/1237
 gypsum, installing, 20/2985
 installing, 13/1855
 insulation, 6/834
 leatherette, for game table, 8/1214
 louvered, as room divider, 15/2192
 for model-car track, 11/1695
 neoprene-base adhesive for, 2/208
 for patio deck, 5/728
 pegboard, 8/1170
 plywood, 2/172, 175, 180, 281;
 3/344; 4/484; 6/900
 prefinished, 3/339; 8/1237; 10/1402
 privacy, for patio or breezeway,
 3/353
 solid wood, 13/1855

Swan system, 2/209
 synthetic stone, 2/206
 tile for rustic bar, 2/175
 translucent, building with, 13/1881
Weldwood flush, 3/339
 wood grain for basement, 2/180
Paper dispenser, kitchen, 13/1891
Parrot tulips, 8/1129
Parsons table, 13/1894
Parting chisel, 11/1548
Parting tool (see chisel), 4/500
Partitions
 decorative blocks, 5/667
 interior, new second story, 15/2170
 movable, in drawers, 6/853
 soundproofing of, 12/1742
 spring pole, 13/1900
 translucent panels for, 13/1881
Paste
 decoupage, 5/749
 wallpaper, 20/2997
 wax, for wood floors, 8/1112
Patching
 driveway, 6/875
 plaster walls, 13/1914
 tent, 18/2710
 wallboard, 13/1918
Patching cement, 5/662
Patio
 acrylic doors, 17/2577
 area, in landscaping plans, 10/1536
 brick, 3/360
 cart planter, 4/491
 chef's cart, 4/487
 concrete, 3/368; 11/1646
 correcting pitch of, 5/666
 designing, 10/1540; 13/1919
 flags, concrete, 3/368
 flagstones, 3/368
 floor, building, 3/355
 for mobile home, 11/1690
 panel of concrete block, 5/673
 paving block floor, 17/2526
 privacy panels, 3/353
 rocker, 8/1187
 screen, wooden, 13/1923
 screening, 3/353
 tables, 5/679; 8/1195
 translucent roofing, 13/1881
 wooden deck, 5/728
Pattern routing, drill press, 6/874
Patterns
 ashlar, for ceiling tile, 4/524
 cardboard, for bolt replacement,
 7/986
 for concrete, 5/659
 in concrete walk, 11/1645
 crosshatch, in color TV, 5/638
 for decorative plaques, 5/704
 in laying shingles, 15/2177
 for machine molding, 21/3167
 Pennsylvania Dutch, 5/746
 for shaping irregular piece, 21/3173
 of shotgun choke, 13/1926; 16/2414
 test, in TV adjustment, 18/2681
 of weather, yearly, 20/3063
Peat moss
 for aerating soil, 12/1751
 as soil conditioner, 11/1575
Pegboard
 entertainment center, 8/1170
 garage storage space, 16/2368
 for tool carrier, 18/2750
 for tool storage, 9/1302; 21/3201
Peninsula counters, kitchen, 10/1442,
 1482, 1495
Perch, identifying, 8/1100, 1105
Percolator, coffee, 5/623
Perimeter burglar alarm system,
 1/73
Personal computer, 5/652
Pest control, 12/1748; 13/1931
Pesticides, organic, 12/1748
pH balance, of swimming pool
 water, 18/2629
Phenolic glue, 12/1705
Phosphorus, as soil nutrient, 11/1575
Photoceil, variable-resistance,
 21/3087

- Photography
 for beginners, 13/1937
 on camping trips, 3/432; 13/1949
 darkroom, 5/717
 of infants, 13/1964
 macrophotography, 11/1620
 of people, 13/1959
 print washer, 5/721
 Schlieren, 15/2300
 strobe, 17/2587
 subjects, handling, 13/1959
 of television scenes, 13/1955
 3-D through microscope, 13/1972
 underwater, 16/2325
 Photomicrographs, stereo, 13/1972
 Picket fence, 9/1372
 Pickup truck
 campers for, 3/404
 cover as RV, 3/405
 and fifth-wheel trailer, 19/2809
 towing trailer with, 3/404; 19/2829
 Picnic tables, 8/1195; 13/1997
 Pifarad, defined, 7/950
 Picture framing, 13/1999
 Pier blocks, concrete
 for patio deck, 5/729
 for wooden deck, 5/739
 Piezelectricity
 as property of quartz, 7/951
 uses of, 7/953
 Pigeons, clay, trapshooting, 16/2389
 Piggy-back rig, for boat, 19/2829
 Piggy-back washer and dryer,
 10/1404
 Pigtail splice, wiring, 17/2482
 Pike dive, in swimming, 17/2622
 Pike, identifying, 8/1104
 *Piloting, Seamanship and Small Boat
 Handling*, 6/814; 12/1713
 Pilot light
 electric, 20/3010
 hot air gas furnace, 9/1330
 Pine
 bonsai trees, 3/334
 cupola, 5/714
 drop leaf server, 16/2330
 dry sink, 6/893
 Dutch Colonial seats, 6/904
 house siding, 16/2427
 library wall cabinet, 3/370
 paddleboard, 2/308
 trees, 19/2872
 wall clock, 4/594
 Pin-tumbler lock, 11/1586
 Pipe
 basement, sweating, 11/1655
 condensation on, 14/2024
 how to cut, 14/2025
 joint compound, 7/1033; 14/2019,
 2024
 painter, 12/1840
 PVC, for directional microphone,
 11/1660
 waste trap, 6/842
 for water system, 16/2438
 Pipe wrench, 7/974
 Pistol
 hand loading ammunition, 14/2133
 improving marksmanship, 16/2386
 reloading ammunition, 14/2128
 shooting range, 16/2386
 Piston
 auto, 4/577
 in automatic choke, 4/578
 compressor, for paint sprayer,
 14/2156
 in disc brake, 6/786
 in hydraulic brakes, 10/1431
 noises, tracking, 14/2149
 in power steering, 14/2048
 vacuum, in power brakes, 6/887
 Piston rings
 auto, servicing, 20/2946
 checking for oil leakage, 12/1745
 Pitfire, for camp cooking, 12/1797
 Pithaya cactus, wild, 12/1791
 Planes
 quality of, 9/1299
 types of, 9/1315
 Planing hull, 10/1417
 Plans
 in boat building, 2/287
 for home additions, 1/32; 9/1378
 Planters
 brick, 3/360
 cast concrete, 5/675
 combination tree and flower, 3/362
 garden cart, 4/491
 redwood, as hi-fi speaker, 17/2518
 in rustic screen, 13/1925
 Planting
 bare-root, in winter, 9/1242
 in fall, 9/1245
 grass seed, 11/1577
 Plant propagation in fluorescent-light
 gardening, 8/1142
 Plants
 choosing, in landscaping, 10/1538
 fertilizer for, 7/1038
 indoor, moving outdoors, 9/1241
 mobile homes, outside decoration
 with, 11/1693
 nursery, buying, 9/1240
 tips for care of, 9/1239
 watering, 9/1248
 winter storage of, 9/1246
 Plant wastes, recycling, 12/1748
 Plaques
 of cast concrete, 5/675
 decorative, how to make, 5/701
 decoupage, 5/748
 oil painting effect on, 5/747
 pierced carving for, 4/504
 Plaster
 bats, for pottery making, 4/531
 gypsum-base, 13/1915
 for patching wallboard, 13/1918
 plaster of Paris, 13/1915
 removing paint from, 16/2460
 walls, patching, 13/1914
 Plasterboard
 installing, 20/2984
 patching, 13/1918
 Plaster of Paris
 for casts of animal tracks, 20/3086
 for patching, 13/1915
 Plastic
 adhesives for, 1/44
 bags, as frostbite protection,
 17/2607
 bathtub enclosure, 7/979
 brick floors, laying, 8/1114
 coating for basement pipes, 11/1655
 cutting board, 14/2009
 as emergency shelter, 17/2609
 étagère of, 14/2013
 for fences, 7/1037
 foam in boat construction, 3/321
 game board, 8/1208
 grouting compound, 8/1114
 imitation stone wall coverings,
 20/3002
 methacrylate, 2/206
 in microwave cooking, 7/943
 panels, 2/178
 piping, 14/2024, 16/2438
 for portable shower, 16/2416
 prints, molding, 15/2311
 sanding, 15/2261
 saw blade for, 19/2782
 screen abrasive, 1/29
 walls for bathroom, 2/204
 wine rack, 14/2009
 Plastic-cutting blade, 10/1496
 Plastic laminate
 bonding of, 1/40; 10/1496
 coffee table, 18/2638
 cutting with table saw, 18/2654
 dry sink surface, 6/893
 electric appliance hatch, 17/2537
 kitchen surfaces, 10/1496; 20/3004
 laundry center surfaces, 11/1569
 Plastic resin glue, 16/2367; 17/2518
 Plastic wrap, dispenser for, 13/1891
 Plate glass, cutting, 9/1290
 Playhouse
 A-frame, building, 14/2016
 little red barn as, 9/1280
 Plexiglass
 for boat windshield, 2/307; 3/322
 motorized surfboard window,
 15/2210
 in pram window, 15/2221
 solar greenhouse, 9/1296
 Pliers
 adjustable, 14/2019
 channel lock, 7/1028
 cut-running, 9/1290
 hackle, 2/189
 needle-nose, 4/473
 repairing, 18/2767
 slip joint, in boat tool kit, 7/974
 types of, 9/1305
 vise-grip in boat tool kit, 7/974
 Plugs, electric
 grounded, 21/3201
 no-strip, 21/3126
 three-pronged, 21/3118
 Plumb bob, types of, 9/1311
 Plumber's friend, 6/842; 14/2020
 Plumber's putty, 7/1033; 14/2019
 Plumbing
 in adding rooms, 9/1392
 in bathroom laundry, 11/1563
 bathroom planning, 10/1400
 clogged drains, 6/842
 condensation on toilet tank, 18/2743
 for darkroom, 5/720
 emergency repairs, 14/2022
 faucet repair, 7/1027
 guide to, 14/2018
 hot-water heating system, 8/1156
 kitchen faucet installation, 7/1032
 kitchen sink replacement, 10/1500
 for new second story, 15/2172
 sensor against freezing, 10/1409
 tips on, 14/2024
 toilet flush tank, replacing, 18/2738
 tools, types of, 9/1321
 valuation safeguards, 14/2020
 Plywood
 adhesives for, 2/281
 backing for inlaid picture, 10/1449
 back pack frame, 9/1366
 birch, 3/344, 348; 8/1168
 boatbuilding, 2/281, 287, 294, 306;
 3/321; 12/1800; 14/2113; 15/2221,
 2220, 2221; 19/2837
 book and magazine table, 18/2641
 bunk beds, 2/235
 buying, 11/1600
 canoes, 3/437
 car-top luggage rack, 4/484
 cedar closets, 4/612
 ceiling squares, 13/1863
 child's footlocker, 8/1163
 coffee table, 18/2638
 Colonial desk, 5/768
 corner desk set, 5/771
 cradle, 8/1160
 curving, 2/291; 12/1800
 chart of grades and uses, 11/1699
 darkroom, 5/720
 deacon's bench, 5/725
 edge treatment, 5/725, 768, 771;
 6/850; 21/3148
 fir, 2/175, 282; 3/339; 6/834, 849
 free-standing storage wall, 17/2572
 garden cart planter, 4/491
 hardwood, cabinet doors, 6/849
 house siding, 10/1405; 16/2426
 kitchen paper dispenser, 13/1891
 Land-sailer, 10/1526
 laundry center, 11/1567
 little red barn floor, 9/1284
 marbleized table top, 12/1816
 model-car track, 13/1694
 plastic-coated, 2/306; 3/321
 prefinished, 4/612; 13/1855
 privacy panels in patio, 3/355
 race car bed, 2/240
 safelight, 5/723
 saw blade for, 19/2782
 secretary desk, 5/762
 sheathing, 6/834; 9/1387
 shelves for étagère, 14/2013
 storage of, 11/1611

- tailgate van extension, 3/406
trunk for tent trailer, 19/2832
in ultralight aircraft, 1/68
veneer, 3/384; 21/3114
wallbed unit, 2/244
wall panels, 13/1863
wall plaque, 5/701
wishing well, 12/1759
workbench top, 21/3177
Pocket computer, 5/654
Pocketknife
 choosing, 10/1502
 sharpening, 16/2343
Pogo sternwheeler, 12/1800
Points, compass, 12/1723
Poles
 aluminum, in entertainment center, 8/1173
 tent, repairing, 18/2712
Pollution control systems, auto, 1/46, 116; 4/474
Polyester
 bricks, 8/1114
 resin glue, 1/43; 8/1205
Polyethylene
 line for boat trailer winch, 19/2823
 towline for water skiing, 11/1634; 20/3043
 water container, 9/1364
Polypropylene
 rope, 10/1516; 11/1634
 towline for water skiing, 20/3043
Polystyrene foam, as insulator, 2/186; 9/1329
Polysulphide
 adhesive, 1/43
 caulking compounds, 4/514
Polyurethane
 paint, removal of, 16/2458
 varnish, 8/1146; 14/2109
Polyurethane foam
 auto filters, 7/1052
 mattress, for camping, 3/426
 upholstery replacement, 8/1203
Polyvinyl acetate glue, 1/43
Poncho
 back pack, 9/1364
 shelter in backpacking, 17/2609
Pool table, building, 14/2026, 20/242
Poppies, 8/1124
Porch
 brick steps for, 3/363
 ceiling, painting, 12/1842
 concrete block panel, 5/672
 covered, off kitchen, 10/1487
 Dutch Colonial seats, 6/904
 iron trim, ornamental, 9/1374
 for mobile home, 11/1690
 translucent panels, 13/1881
Porcupines, camp intruders, 20/3077
Portaging, with canoe, 3/461
Portland cement, 5/658, 663
 for concrete, 11/1644
 in mixing mortar, 3/360; 9/1381
 in repairing stucco, 17/2597
 for tuckpointing, 11/1656
Portraits, photographic, 13/1959
Positive crankcase ventilation (PCV), 1/116; 7/1000; 12/1744
Posts
 fence, 7/1037
 wrought iron railing, 14/2118
Potash
 in fertilizer, 7/1048
 as soil nutrient, 11/1575
Potentiometer, 5/648
 in clock radio, 14/2112
 in scrambler circuit, 18/2665
 tone and chord generator, 18/2745
Pottery
 thrown without wheel, 4/531
Power
 electric, blackout, 8/1159
 low-voltage for hobbyist, 21/3196
 in portable television, 18/2690
Power boats, light requirements for, 12/2712
Power brakes, troubleshooting, 6/887
Power sanders, 1/30
Power supply
 for antique radio, 14/2109
 in restoring clock radio, 14/2110
Power system, garage door, 8/1221
Power tools
 bandsaw, 4/491, 564; 8/1160, 1183, 1208; 9/1366; 19/2860; 21/3139
 belt sander, 1/31; 8/1213; 16/2436
 chain saw, 7/1010; 11/1636; 18/2773
 circular saw, 5/725; 6/801, 856, 901; 8/1208; 10/1459, 1496; 13/1999; 14/2052; 16/2421; 17/2541, 2580; 18/2768; 21/3113, 3167
 combinations, 14/2054
 cut-off saw, 18/2768
 cut-off switch for, 18/2647
 disk sander, 1/28; 8/1106, 1145, 1187
 drill press, 4/498; 5/727; 6/859, 869; 10/1458; 13/1999; 19/2792, 2797, 2860; 21/3167
 drum sander, 8/1106, 1187; 14/2059
 electric drill, 1/27; 3/355; 6/820, 856, 909; 8/1226; 9/1301; 13/1881; 14/2052, 2056, 2118
 extension cord for, 18/2768
 fly-cutter, 19/2792
 grounding of, 18/2768; 21/3118
 jig saw, 3/384; 4/594; 6/895; 8/1208; 9/1366; 10/1446; 17/2480, 2580
 orbital sander, 1/30; 7/1064; 14/2054; 17/2512
 pad sander, 15/2259
 radial arm saw, 3/342; 5/725; 6/863, 901; 8/1145; 10/1496; 14/2092, 2099; 16/2331; 19/2797; 21/3139, 3167
 reciprocal sander, 1/28
 reciprocating saw, 10/1496
 router, 4/561, 594, 597; 10/1458; 14/2052; 15/2198; 16/2332, 2339; 17/2541; 19/2865
 saber saw, 3/372, 384; 4/564, 594, 603; 5/725; 6/894; 7/1020; 8/1163, 1174, 1183, 1187; 9/1366; 14/2009, 2052; 15/2227, 2234; 16/2331; 17/2480
 saw blade, choosing, 19/2782
 selecting, 9/1298; 14/2052
 table saw, 3/348, 375, 376; 4/561, 597, 602; 6/861, 901; 8/1212; 10/1496; 16/2332; 17/2511, 2541; 18/2647; 19/2788, 2804
 wooden ladder safe with, 10/1520
Pram
 building, 15/2218, 2221; 19/2837
 suspension storage of, 17/2563
Preservative
 for cut flowers, 8/1124
 for fence posts, 7/1037
 wood, against termites, 9/1288
Press
 for molding plastic prints, 15/2312
 for shell case reloading, 16/2382
 for wood bending, 21/3142
Pressure
 electrical, 6/926
 fuel pump testing, 8/1147
 steam, excess in hot-water heating system, 9/1345
 tire, 18/2725; 19/2811
 water, in dishwasher, 6/792
Printers, computer, 5/655
Printing
 linoleum plates, 14/2066
 of photomicrographs, 13/1980
Prints
 molding plastic, 15/2311
 stereo, mounting, 13/1981
Privacy
 in landscape planning, 10/1537
 panels for patio or breezeway, 3/353
 with telephone scrambler, 18/2665
 trees for, 19/2872
Privileged vessel, and right of way, 12/1713
Professional Association of Diving Instructors, 16/2319
Programming computers, 5/652
Projector
 overhead, 14/2070
 smoke box optical bench, 15/2307
 for viewing plastic prints, 15/2311
Propagation
 of geraniums in winter, 9/1245
 in fluorescent light, 8/1142
 by grafting, 9/1292
 tub, 9/1243
Propane torch, in plumbing repairs, 7/1033
Propeller, boat
 check for spring season, 11/1634
 "hand," 3/315
 noise in, tracking, 14/2150
 spare, in tool kit, 7/974
 store separately, 17/2560
Protractor, 5/746; 6/833
 course, in boating, 12/1726
Pruning, 9/1242, 1246
 bonsai trees, 3/334
 evergreens, 19/2879
Public address system, operating, 14/2079
Puff (picofarad), 7/950
Pumice, as abrasive, 1/26
 in furniture refinishing, 7/1061
 in wood finishing, 7/1071
Pump
 accelerator, checking, 7/1006
 fuel, 7/986, 1004; 8/1147; 13/1908
 swimming pool, 18/2627
 water, for vacation home, 16/2438
Punches, types of, 9/1317
Purse, felt, making, 21/3205
Putty
 glazing, 9/1291
 knife, 12/1813
 for paddleboard, 2/309, 310
 plumber's, 6/847; 7/1033; 14/2019
 in repairing auto dents, 14/2151
 wood, 21/3147
Q
Q (quality factor), in radio resonance, 7/954
Quail, hunting, 10/1426
Quality of tools, judging, 9/1299
Quarry tiles, 18/2720
Quartz crystal, 7/951
 processing of, 7/954
Q of, 7/954
Quartz-iodine lamp, for overhead projector, 14/2070
Quick-light lantern, 3/442
Quick dive, in swimming underwater, 17/2622
Quicksand, escaping from, 14/2084
Quince, flowering, cuttings, 9/1244
R
Rabbeted house siding, 16/2427
Rabbling
 basics of, 21/3152
 cabinet doors for hinges, 6/850
 with molding head, 19/2804
 with multiple saw blades, 19/2790
 with portable router, 15/2198
 with routing bit, 6/869
 with table saw, 18/2651; 19/2804
 window screen frames, 16/2317
 with wood shapers, 19/2797
Raccoons, as camp intruders, 20/3077
Race car bed, 2/240
Racing boat, building, 14/2086
 engine for, 14/2091
Racks
 hanging, as garage storage, 16/2368
 sliding, for wardrobe, 8/1180

- spice, 17/2478
- for storing lumber, 11/1611
- tool, 21/3182, 3201
- Radial arm saw**
 - bending wood, 21/3139
 - bevel cutting, 3/342
 - boring with, 14/2099
 - in building hatch, 6/901
 - cutting plastic laminate, 10/1496
 - drilling holes, 6/863
 - how to use, 14/2092
 - jointing with, 19/2797
 - for moldings, 21/3167
 - routing with, 14/2099
 - for stone foyer, 8/1145
 - for straight cuts, 5/725
 - trimming rough-cut boards, 16/2331
- Radial auto tires**, 18/2725
- Radiant heating**, 8/1155
- and insulation, 9/1330
- stoves, 17/2582
- Radiator**
 - auto, 5/684
 - hot-water heating system, 8/1156; 9/1342
- Radio**
 - AC/DC servicing, 9/1355
 - AM, 7/951
 - antenna for, 1/104
 - auto, 6/913
 - battery for, 2/219
 - as camping necessity, 3/428
 - citizens' band, 4/589; 7/951
 - clock, restoring, 14/2110
 - crystal, 7/951
 - experimenting with loudspeakers, 15/2286
 - FM, 1/104
 - garage-door operator, 8/1227
 - in intercom system, 10/1465
 - interference, 8/1134
 - restoring antique, 14/2104
 - scrambler circuit for, 18/2665
 - stereo, home, 17/2497
 - stereo, car, 17/2501
 - transistor, portable, 9/1361
 - for weather forecasts, 20/3058
- Radiotelephone**, marine, 7/960
- Raft**, for children, 14/2113
- Raffers**
 - dormer, preassembly of, 6/834
 - framing, in home addition, 9/1388
 - locating, 6/831
 - for patio roof, 3/358
- Raggedy Ann or Andy plaque**, 5/701
- Rail fence**, 9/1372
- Railing**, wrought-iron, 12/1842; 14/2118
- Rainbow trout**, identifying, 8/1104
- Ramp**
 - to raise auto, 7/1052
- Range**
 - kitchen, 7/931; 10/1489
 - of optical communication, 5/651
- Range finder**, camera, 13/1938, 1956
- Ranunculus**, 9/1261
- Raspberries**, wild, 12/1790
- Rasps**, types of, 9/1308
- Raster**, in adjusting TV color, 5/640, 646; 18/2672, 2695
- Ratchet screwdrivers**, 9/1313
- Ratchet wrench**, 8/1226
- Razor**, electric
 - sharpening, 16/2358
- Receiver**, satellite, 1/111, 113, 114
- Receiver stereo**, 17/2497
- Receptacles**, electric, 20/3010
- grounding**, 21/3118
- in workbench**, 21/3182
- Recipes**
 - baked duck, 10/1425
 - clambake, in foil, 12/1796
 - onion butter, 12/1793
 - sandwiches-in-a-bundle, 12/1796
- Recording**, auto upholstery, 19/2928
- Record changer**, servicing, 9/1361
- Record player**
 - in intercom system, 10/1465
 - in stereo equipment, 17/2497
- Recreational vehicle**, 3/396
 - check list for, 3/421
 - handling, practice in, 19/2812
 - maintenance for, 3/443
 - and scuba-diving tours, 16/2326
 - tips for towing, 19/2810
- Rectifier**
 - circuit, in hi-fi tuner, 9/1360
 - duo-diode, in TV repair, 18/2699
 - high-voltage, in TV repair, 18/2697
 - in remote control switches, 14/2140
 - selenium, in portable TV, 18/2690
 - silicon, in auto alternator, 1/85
 - silicon controlled, in security sensors, 10/1410
 - silicon diode, in portable TV, 18/2690
- Reducer strips**, for doorsill, 8/1119
- Redwood**
 - deck, 5/738
 - Dutch Colonial seats, 6/904
 - fence storage shed, 7/1043
 - house siding, 16/2427
 - motorized surfboard, 15/2211
 - patio table, 8/1195
 - picnic table, 13/1997
 - planter, hi-fi speaker, 17/2518
 - sauna bath, 15/2270
 - van conversion, 20/2960
- Refinishing**
 - antiquing, 1/123
 - equipment for, 7/1057
 - finishes, 5/764
 - removing old finish, 7/1057; 8/1106
 - rocker, 8/1204
 - used furniture, 8/1199
 - wood floors, 8/1106
- Reflector**
 - parabolic, 11/1659, 1665
 - specular, 10/1442
- Refrigerator**
 - door gasket repair, 4/516
 - in new home planning, 10/1403
 - placement of, 10/1489; 14/2122
 - repair and maintenance, 14/2121
- Regulator**, auto, 6/916
- in alternator**, 1/86
- Relay**
 - auto starter, 7/990
 - in remote control switching, 14/2138
- Remodeling**
 - adding a room, 9/1377
 - attic, 1/136
 - basement, 1/32
 - dormer, 6/831
 - front of home, 9/1372
 - garage, 1/32
 - kitchen, 10/1485
 - planning for home additions, 1/32
 - preparing for paneled walls, 13/1867
 - suspended ceiling installation, 4/527
 - tile ceiling installation, 4/517, 521
- Remote control switches**, 14/2138; 20/3015
- Remote stations**, of intercom systems, 10/1465
- Repair**
 - antiques, 3/390
 - auto, 1/148; 2/161; 4/471; 7/989; 8/1147; 14/2048, 2143, 2151, 2156
 - ball joints, 2/161
 - bicycle, 2/259
 - blender, 2/276
 - boat, while afloat, 7/974
 - carburetor, 4/471
 - car tape players, 4/510
 - cassette player, 4/506
 - chain saw, 11/1636
 - clothes dryer, 20/3028
 - coffee maker, 5/623
 - disc brakes, 6/786
 - dishwasher, 6/791
 - doorbell, 6/822
 - door brakes, 6/876
 - electric appliances, 1/126
 - electric range, 7/931
 - faucets, 7/1027
 - fireplace, 7/1073
 - fluorescent lights, 8/1134
 - front-wheel drive auto, 1/148
 - fuel pump, 8/1147
 - gutters, 15/2183
 - hot-air gas furnace, 9/1334
 - irons, steam or dry, 10/1471
 - masonry, 5/662; 11/1654
 - mixer, 11/1671
 - plaster walls, 13/1914
 - plumbing, 14/2020
 - power steering, 14/2048
 - refrigerator, 14/2121
 - roofs, 15/2183
 - small engines, 7/1010
 - starter, 7/989
 - stucco surfaces, 17/2597
 - tape recorder, 18/2656
 - television, 5/631, 641; 9/1355; 18/2671, 2676, 2689
 - tent, 18/2709
 - toaster, 18/2733
 - toilet flush tank, 18/2738
 - tools for, selecting, 9/1298
 - trash compactor, 19/2853
 - walkie-talkie, 20/2980
 - wallboard, 13/1918
 - washing machine, 20/3018
- Resistor**
 - electric, 6/923
 - fusible, television, 9/1362
 - ignition, 10/1436
 - tone and chord generator, 18/2749
- Resorcinol glue**, 1/44; 2/306; 8/1199
- Retaining walls**, 17/2527
- Rifles**
 - ammunition, making, 16/2381
 - autoloading, 16/2408
 - hand loading ammunition for, 14/2132
 - improving marksmanship with, 16/2386
 - roll in, 16/2406
 - reloading ammunition for, 14/2128
- Right-of-way**, for vessels, 12/1711
- Ripping**
 - lumber, with radial arm saw, 14/2093
 - methods of, 18/2650
 - saw blade for, 19/2782
 - tapered, 18/2651
- Ripsaw**, 15/2277
- Rocker**
 - patio, 8/1187
 - rebuilding, 8/1204
- Rollers**
 - ink, for linoleum blocks, 14/2067
 - paint, 12/1807, 1836, 1848
- Roller support**, for large workpieces, 19/2804
- Roof**
 - dismantling, 15/2166
 - dormer, addition of, 6/831
 - flashing, for new second story, 15/2171
 - flat, 15/2181, 2188
 - framing, for new second story, 15/2170
 - gable, 5/714; 10/1400
 - for garage addition, 16/2370
 - gutters, caulking compounds for, 4/514
 - in home addition, 9/1388
 - light-colored for coolness, 10/1406
 - matching pitch, when adding room, 9/1378
 - material for, choosing, 15/2175
 - paint for, 12/1840
 - patching compound, 15/2191
 - patio, 3/357
 - repairing, 15/2183
 - resurfacing, 15/2188
 - roll roofing, 6/836, 8/1234; 9/1390; 12/1840; 15/2178; 17/2558
 - ventilation under, 5/714
- Room air conditioners**, 1/54
- Room divider**
 - closets, 4/611
 - concrete blocks, 5/671

- entertainment center, 8/1170
 lowered panels, 15/2192
 prefabricated fireplace, 7/1082
 rustic, 13/1923
 shutters, 16/2424
 spring pole, 13/1901
 television, portable, in, 15/2192
 translucent panels, 13/1881
 unit for folding bed, 17/2531
 unit with desk and storage space, 17/2541
- Rope**
 knotting, 10/1516
 nylon, 9/1366; 10/1516; 11/1634
 sisal, netting for chaise, 4/553
 tent, checking, 18/2712
 Roses, 9/1260
 root feeding, 9/1254
- Rotary engine**
 mini, 15/2196
 tuning up, 19/2918
- Rotor**
 alternator, 1/85
 in anemometer, 21/3091
 auto, 10/1433; 19/2904
 in boat engine, 2/313
 compressor, for paint sprayer, 14/2156
 electronic ignition system, 1/153
 10/1435
 spare, in boat tool kit, 7/974
 Wankel engine, tune-up, 19/2918
- Rottenstone**, as abrasive, 1/26;
 7/1061, 1071
- Round-nose chisel**, 11/1548
- Router**
 choosing, 14/2052
 for fluting posts, 16/2339
 for grooving table legs, 19/2865
 how to use, 15/2198
 in inlay work, 10/1458
 for rabbeting, 4/561; 16/2332
 for room divider, 17/2541
 for rounding edges, 4/594
 in woodworking, 4/597
- Routing**
 with drill press, 6/869
 with electric drill, 6/860
 freehand, 14/2103
 with radial arm saw, 14/2101
 in wood carving, 4/497
- Rowboat**, 15/2218, 2221
 light requirements for, 12/1712
- Rugs**
 to muffle sound transmission, 4/522
 removing spots from, 17/2484
- Runabout boats**
 pram, 15/2221; 19/2837
 sailing dinghy, 15/2218
 surfboard, motorized, 15/2210
- Running lights**,
 boat, requirements for, 12/1711
 reading, 12/1715
- Rust**
 in auto cooling system, 5/690
 boat hull, 11/1627
 in drum brakes, 6/884
 in electric socket, 6/914
 prevention, in small engines, 7/1012
 removal of, 1/27; 6/884, 914;
 11/1627; 18/2764
 on tools, 18/2764
- Rye grass**, for lawn, 11/1574, 1580
- S**
- Saber saw**
 for carving cuts, 5/725
 choosing, 14/2052
 for cutting curves 3/372, 384;
 4/564, 594, 603; 7/1020; 8/1163,
 1174, 1183, 1187; 9/1366; 17/2480
 for cutting scallops, 6/894
 for drilling acrylic, 14/2009
 how to use, 15/2227
 rough-cutting long boards, 16/2331
 tricks with, 15/2234
- Safety**
 acrylic glazing, 17/2577
 in adding electric circuit, 4/585
 in adjusting alternator, 1/88
 in auto clutch use, 4/622
 bicycle, 2/250, 254
 in blender repair, 2/277
 boat, 3/326, 327; 11/1631; 15/2238
 burglar alarms, 1/70, 75, 78
 candle making, 3/454
 in canoeing, 3/458
 chain saw precautions, 18/2773
 in chimney cleaning, 7/1075
 in color television repair, 5/636
 driving, 15/2246
 in electric appliance repair, 1/135
 fencing, a factor in, 7/1036
 against freezing, 17/2604
 gun safety catch, checking, 16/2378
 home, 15/2242
 kitchen, 10/1438, 1481, 1495
 ladder use, 10/1524
 in laser beam use, 10/1544
 in launching boat, 3/326
 in microwave ovens, 7/946
 in paint remover use, 8/1206
 in power tool use, 14/2054; 18/2647
 protection of eyes in cutting
 laminates, 10/1496
 with quartz-iodine lamp, 14/2076
 in sanding, 1/28
 sawing, 14/2061
 solvent-type adhesives, 2/200
 spearfishing, 16/2320
 swimming pool, 18/2628
 in television adjustment, 18/2681
 in testing gas furnace transformer,
 9/1337
 tests, in electric work, 21/3120
 trailer, 3/326; 19/2807, 2810,
 2821, 2827
 in ultralight aircraft, 1/65
 water, 15/2248, 2251; 17/2610,
 2614; 18/2628
- Safety glass**, 3/322; 16/2419;
 17/2577
- Safety shoes**, ladder, 10/1523
- Safety stands**, auto, 7/1001, 1051
- Sailboat**
 inspecting for spring, 11/1632
 light requirements for, 12/1712
- Sailing**
 for beginners, 15/2254
 glossary of terms, 15/2257
- Sails**
 for Land-sailer, 10/1526
 for pram, 19/2845
 putting on, 15/2255
- St. Augustine grass**, for lawn,
 11/1573
- Salmon**, identifying, 8/1105
- Sand**
 as aggregate, 5/657
 for concrete, 11/1644
 in mixing mortar, 3/360
 oiled, for garden tool care,
 9/1241
- Sand cherry**, wild, 12/1790
- Sanders**
 belt, 1/31; 6/856; 8/1213; 14/2054;
 16/2436
 choosing, 14/2052
 disk, 1/27; 6/856; 8/1106, 1145,
 1187; 14/2054
 drum, 8/1106, 1187; 14/2059
 orbital, 1/30; 7/1064; 14/2054;
 17/2512
 pad, 14/2060; 15/2259
 reciprocal, 1/28
 straight-line, 7/1064
- Sanding**
 acrylic sheet, 8/1210
 in antiquing, 1/123; 11/1602
 in auto painting, 12/1820
 basic procedures for, 15/2259
 before staining, 17/2488
 boat hull before painting, 11/1627
 edges and end grains, 21/3145
 with electric drill, 6/859
- in furniture refinishing, 7/1058
 of inlays, 3/391
 methods of, 1/27
 new work, 3/347, 350
 plywood, 2/282
 rules for, 11/1627
 safety, 1/28
 unfinished furniture, 19/2925
 wheel, 1/30
 in wood carving, 4/498
 in wood turning, 11/1558
 Sanding block, rubber, 12/1820
- Sanding drum**
 in lathe jig, 11/1559
 in making wood trays, 19/2860
- Sand paper**, 12/1853
- Sandpaper**
 in decoupage, 5/749
 for doorbell contacts, 6/826
 fine-grit, 3/347
 furniture refinishing, 7/1059
 in glass cutting, 3/352
 lathe jig, 11/1560
 rounding edges, 4/594
 shaping with, 1/28
 types of, 1/25; 15/2260
 for unfinished furniture, 19/2925
 waterproof auto body, 12/1820
 wet-or-dry, 3/352; 5/749; 14/2010,
 2013
- in wood turning**, 11/1558
- Sandstone**
 as abrasive, 16/2347
 for stone foyer, 8/1144
- Satellite TV antenna**, 1/110
- Sauna bath**, 15/2265
- Saw blades**
 choosing, 19/2782
 cleaning, 19/2787
 hollow-ground, 19/2784, 2793
 multiple, 19/2788
 sharpening, 19/2785
 storage of, 19/2785
- Sawdust**, in tiling, 4/547
- Sawhorse mini-workshop**, 18/2753
- Sawing**, techniques of, 18/2769
- Saws**
 bandsaw, 4/491, 564; 8/1160, 1183,
 1208; 9/1366; 19/2860; 21/3139
 bayonet, 4/491; 8/1160
 bench, 4/491
 chain, 7/1010; 11/1636; 18/2773
 circular, 5/725; 6/801, 865, 901;
 8/1208; 10/1459, 1496; 13/1999;
 14/2052; 16/2421; 17/2541, 2580;
 18/2768; 21/3113, 3167
 coping, 4/524, 594, 603; 5/758;
 6/805; 7/979
 crosscut, 3/413; 15/2277; 16/2355;
 19/2782
 cut-off, 18/2768
- handsaw**, 2/306; 15/2277; 18/2765;
 19/2782
- jig saw**, 3/384; 4/594; 6/805, 856,
 895; 7/1020; 8/1208; 9/1366;
 10/1446; 14/2009; 16/2333;
 17/2480, 2580
- portable**, quality of, 9/1301
- power**: See **Power tools**
- radial arm**, 3/342; 5/725; 6/863,
 901; 8/1145; 10/1496; 14/2092,
 2099; 16/2331; 19/2797; 21/3139,
 3167
- saber**, 3/372, 384; 4/564, 594, 603;
 5/725; 6/894; 7/1020; 8/1163,
 1174, 1187; 9/1366; 14/2009, 2052;
 15/2227, 2234; 16/2331; 17/2480
- safe use of**, 14/2061
- scroll**, 2/271; 4/504; 13/2003
- sharpening**, 16/2341
- table**, 3/348, 375, 376; 4/561, 597,
 602; 6/861, 901; 8/1212; 10/1496;
 16/2332; 17/2511, 2541; 18/2647;
 19/2788, 2804
- two-man**, 9/1308
- types of**, 9/1306
- venom**, 10/1458
- Scaffolding**, 6/835; 15/2166, 2184
- Sealing**, of paint, 11/1630

- Science projects, 10/1542; 11/1620, 1658, 1665; 13/1972, 1983; 15/2280, 2286, 2292, 2302, 2311; 17/2587; 21/3087
- Scion, grafting, 9/1292
- Scissors, sharpening, 16/2344, 2357
- Scissors kick, 17/2614, 2624
- Scooters, maintenance of, 7/1012
- Scrambler phone, 18/2665
- Scraping tools, 11/1549
- cabinet, 7/1060, 1062; 9/1308; 10/1450
- carbide, masonry painting, 12/1813
- Screening
- aluminum, for patio, 3/353
 - fiberglass, 3/353; 16/2317
 - galvanized, 3/353
 - in landscaping plan, 9/1267
 - tent, repairing, 18/2711
- Screens
- aluminum, 1/90
 - basement, 1/96
 - built-in, for patio, 5/728
 - decorative block, 5/667
 - installing with staple gun, 17/2494
 - modular, patio or breezeway, 3/353
 - molding for, 12/1704
 - pierced carving for, 4/504
 - privacy, 10/1537; 13/1923
 - window, 1/90; 12/1704; 16/2317
- Screen wall, concrete, 11/1647
- Screwdrivers, 4/474; 14/2019
- Philips, 2/277
- types of, 9/1312
- Scroll saw, 2/271; 4/504; 13/2003
- Scrub persimmon, wild, 12/1791
- Scuba diving, 16/2319
- Scuba Schools International, 16/2319
- Scythe stone, 2/195
- Sea Angler boat, 2/306
- Sealant
- aerosol spray, 5/750
 - in boat construction, 3/321
 - epoxy, for concrete floors, 8/1110
 - for gaskets, 7/988
- Sealer
- epoxy, 2/184
 - low-gloss, 8/1114
 - resin, 17/2520
 - silicon, for percolator, 5/629
 - for wood before staining, 17/2491
- Seamanship
- acquiring basics of, 3/320
 - course, 6/806
- Sea shells, collecting, 16/2360
- Seats
- cane-webbing, 8/1206
 - Dutch Colonial, 6/904
 - for rocker, 8/1205
- Secretary desk, 5/762
- Securing knot, 10/1518
- Security, home
- burglar alarms, 1/70; 10/1465
 - intercom system alarm, 10/1465
 - sensors, 10/1407
- Seepage, in basement walls, 11/1655
- Selectivity
- in CB radio, 4/593
 - in radio spectrum, 7/951
- Self-adhesive tiles, 8/1116
- Self-Contained Underwater Breathing Apparatus (scuba), 16/2319
- Semi-displacement boat, 10/1418
- Semi-planing boat, 10/1418
- Sensitivity
- in CB radio, 4/591
 - lack of, in AC/DC radio, 9/1358
- Sensor
- optical, in anemometer, 21/3087
 - security, 10/1407
- Septic system, 6/842
- problem in rocky areas, 10/1399
- in vacation home, 16/2439
- Server
- drop-leaf, 16/2330
 - roll-about, 16/2337
- Serviceberry, wild, 12/1790
- Service drop, electric, 6/925
- Sewing cabinet, 8/1174
- Sewing center, in laundry area, 11/1566
- Shadow box
- picture frame, 13/1999
- Shaggy-mane mushroom, 12/1787
- Shaper, wood
- for grooving table legs, 19/2865
 - for moldings, 21/3167
 - portable router as, 15/2198
 - for rabbeting, 4/561
- Shaping large workpieces, 19/2804
- Sharpening
- electric razor, 16/2358
 - sharp edges for, 16/2341
 - stones for, 16/2346
 - techniques of, 16/2349, 2352
 - of tools, 16/2341, 2346, 2352
- Shaving bar, 2/171
- Sheathing
- for dormer, 6/834
 - for home addition, 9/1382, 1387
 - interior plywood for, 11/1601
 - for new home, 10/1405
 - roof, removal of, 15/2167
 - Sheet bend knot, 10/1518
- Shellac
- for floors, 8/1109
 - gasket, 7/988
 - over plaster patch, 13/1918
 - removal of, 7/1057; 8/1206
 - scrap lumber, 11/1604
 - stained wood, 17/2489
 - to tone down colors, 5/747
 - as wood finish, 4/499; 7/1060, 1068; 8/1206; 19/2926
 - wood turnings, 11/1558
- Shelves
- bookshelf-table, 3/339
 - breakfront cabinet, 4/550
 - cradle-type, 3/344
 - with Dutch Colonial seats, 6/904
 - entertainment center, 8/1170
 - fence storage shed, 7/1042
 - garage space, 16/2368
 - grandfather's clock, 4/601
 - laundry cabinet, 11/1571
 - library, 3/370
 - room divider, 15/2192
 - tool chest, 18/2760
 - under-stairs food storage unit, 17/2534
 - utility, 16/2374
 - wall, 16/2365
 - walled unit, 2/244
 - whatnot, 4/505
 - workbench, 21/3182
- Shield
- for directional microphone, 11/1662
 - paint, for baseboard, 12/1851
- Shift cables and knobs, bicycle, 2/259
- Shims
- in bathroom paneling, 2/208
 - under caliper bolts, 2/229
 - in Sea Angler, 2/306
- Shingles
- asbestos, 15/2176
 - buying, 11/1596
 - choice of, for new home, 10/1405
 - for dormer, 6/836
 - as house siding, 16/2426
 - repairing, 15/2183
 - roof, 9/1287, 1390
 - stain for, 12/1839
 - wood, 11/1596; 15/2180
- Shock absorbers
- auto, 13/1913; 14/2150; 16/2375
 - for boat trailer, 19/2820
 - in minibike, 11/1670
 - replacing, 13/1913; 16/2375
 - tap-the-brakes test, 16/2375
- Shock waves, visible, 15/2293
- Shoe polish stains, removal of, 19/2932
- Shooting
- getting gun in shape, 16/2378
 - hand loading ammunition, 14/2137
 - improving marksmanship, 16/2386
 - learning at home, 16/2409
 - practice, 16/2380
 - recoil, 16/2406
 - skeet shooting, 14/2137; 16/2397
 - trapshooting, 14/2137; 16/2389
 - waterfowl, 10/1419
- Shooting jacket, with recoil pad, 16/2406
- Shore, shape of, in boating, 12/1730
- Short circuit
- in appliance repair, 1/134
 - in auto appliances, 6/911
 - in fluorescent light, 8/1135
- Shotgun
- autoloading, 16/2390, 2404
 - bore, in skeet shooting, 16/2405
 - chokes, basics, 13/1926; 16/2411
 - double-barrel, 16/2404, 2412
 - gas-operated, 16/2407
 - hand loading shells, 14/2132
 - learn to shoot at home, 16/2409
 - pattern, 13/1926; 16/2411
 - recoil, 16/2406
 - reloading ammunition, 14/2128
- Shot size
- in hunting, 10/1422, 1427; 16/2414
 - in trapshooting, 16/2396
- Showcase gun rack, 6/801
- Shower
- acrylic door for, 16/2419
 - portable, for camping, 16/2416
- Shredder-grinder, compost, 12/1751
- Shrinkage, in plywood, 2/281
- Shrubs, functional use in landscaping, 9/1265
- Shuffleboard court, 8/1110
- Shutters
- building, 16/2422
 - painting, 12/1841
- Shutter speed
- in infant photography, 13/1970
 - learning about, 13/1917
 - and lens opening, 13/1939
 - in photographing television scenes, 13/1956
 - in strobe photography, 17/2594
- Siberian squill, 8/1131
- Side guides, for cabinet drawers, 6/853
- Sideline, in water skiing, 20/3039, 3044
- Sidestroke, 17/2614, 2624
- Sidewalk cracks, filling, 5/663
- Siding
- aluminum, 6/836
 - checking, in roof repair, 15/2185
 - for garage addition, 16/2370
 - for home addition, 9/1390
 - for new second story, 15/2171
 - rough, stain finish for, 12/1839
 - selecting, 10/1405; 16/2425
 - ship-lap, 6/835
 - stopping leaks in, 16/2435
 - tongue-and-groove, 9/1285
- Sighting in, of gun, 16/2379
- Sighting scope, for laser beam voice transmitter, 10/1546
- Signal, television, 18/2673
- Signals, for vessels in bad weather, 12/1711
- Signal tracer, in repairing tape player, 4/512
- Silica gel
- to dry workshop air, 18/2764
 - pack with camera, 3/437
- Silicon carbide
- as abrasive, 1/25; 10/1506; 16/2346
 - cut-off wheel, 19/2784
 - oilstone, 16/2344
 - sandpaper, 15/2260
- Silicon controlled rectifiers (SCR), in security sensors, 10/1410
- Silicon dioxide (quartz), 7/951
- Silicon rectifier, in auto alternator, 1/85
- Silicone rubber caulking compounds, 4/514, 516; 17/2472
- Single early tulips, 8/1129
- Single overhand knot, 10/1511

- Sink
in countertop ceramic tiling, 4/539
drain, clogged, 6/842; 14/2025
kitchen, 10/1489, 1500
lavatory, 14/2025
in modular laundry center, 11/1570
Siphon-feed spray gun, 12/1821
- Size
boat, factor in trailer choice, 19/2814
lathe, determining, 11/1547
lumber, 11/1598
shot, 10/1422, 1427; 13/1927; 16/2414
workshop, 21/3200
- Sizing, of walls, 20/2994
- Sizing cuts, in wood-turning, 11/1552
- Skew chisel, 4/495, 501; 11/1548
- Skier's salute, water skiing, 20/3048
- Skiff, 15/2221; 16/2442
- Skiing, water: *See* Water skiing
- Skin diving, 16/2324
in sea shell collecting, 16/2363
- Skinning knife, 10/1503
- Skip, in CB radio, 4/592
- Skirting, mobile home, 11/1681; 1690
- Skunks, camp intruders, 20/3077
- Slab-on-grade construction in home building, 10/1400
- Slate
for roofing, 15/2175
for stone foyer, 8/1144
- Sleeper rig, in pickup truck, 19/2829
- Sleeping bag
for camping, 3/417
foul-weather camping, 3/426
insulator for, 3/448
maintenance of, 3/444
making, 3/447
in packing back pack, 9/1370
prewarming, 17/2604
- Sleeves, caliper float, 6/790
- Slide manipulator, photographic, 13/1973
- Sliding table jig, for cutting miter points, 10/1476
- Slip, boat, technique of leaving, 6/812
- Slip, in pottery-making, 4/536
- Slip knot, 10/1511
- Slipping, of clutch, 4/618
- Slip stone, in tool sharpening, 16/2354
- Slugs, protecting plants from, 9/1240
- Small-cupped daffodil, 8/1130
- Smallmouth bass, identifying, 8/1101
- Smoke box optical bench, 15/2302
- Smoke detectors for the home, 10/1407; 16/2327
- Smoke rings air cannon, 15/2280
- Snake
pipe, 6/843; 14/2019
for wires, 4/586; 6/818
- Snakes
snakebite, treatment of, 16/2449
Snorkeling, 16/2319; 17/2610
- Snow blower, maintenance of, 7/1010
- Snowdrop bulbs, planting, 8/1127
- Snow, in TV picture, 18/2699
- Snowmobile
maintenance of, 7/1010
rotary engine for, 15/2196
- Snow tires, for auto, 18/2729
- Socket
chisel, 4/569
wrench, 7/996, 1003, 1030; 16/2470
- Soda ash, for swimming pool pH balance, 18/2633
- Software, for computer programming, 5/653
- Soil
analysis of, 12/1749
compacted, 9/1251
factor in landscaping plan, 9/1270
nutrients for, 11/1575; 12/1750
preparing for lawn, 11/1575
preparing for tree transplant, 19/2882
- Soil auger, 9/1250
- Soil-pipe snake, 6/843; 14/2019
- Solar
greenhouse addition to home, 9/1296; 16/2454
heating systems, 16/2453
- Solder, paste, in plumbing, 7/1033
- Solder, wire, 7/1034
- Soldering, of electrical connections, 6/920
- Soldering irons
pencil type, 4/510
types of, 9/1318
- Solderless electrical connections, 6/920
- Solenoid
chimes, 6/815
coils of washing machine, 20/3021
remote control switches, 14/2140
starter, 7/990
tape player, 4/512
throttle, 13/1904
trigger system, 13/1985
- Solenoids, dispensing, in dish-washer, 6/800
- Solar Tables, for trout fishing, 19/2893
- Solvent
air cleaner, 1/48
auto engine cleaning, 7/1002
boat trailer wheel bearings, 19/2821
carburetor dirt, 4/469, 476
choke, 4/578
drum brakes, 6/877
finish removal, 16/2458
heat riser, 9/1348
hydraulic valve lifters, 7/997
lighten stain finish, 17/2492
plastic laminates, 10/1498
power brake filter, 6/890
vinyl caulking, 4/514
Soot remover, chemical, 7/1074
- Sound
absorption, 4/521
amplification, 11/1658
barriers, 12/1740, 1742
low-frequency, 17/2518
stereo equipment, 17/2497
tape recorder, 18/2658
television, problems with, 9/1362
transmission, 4/521
walkie-talkie, 20/2983
waves, visible, 15/2292
- Sounding rod, in tracking auto noises, 14/2148
- Sound signal, television, 18/2673, 2695
- Sound system, recorded tapes for, 18/2661
- Southern exposure
in landscaping, 10/1534
in patio design, 13/1922
- Spackle
for filling cracks, 12/1852
preparing walls for paper, 20/2994
in repairing wallboard, 13/1918
smoothing, with pad sander, 15/2259
- Spading fork, in gardening, 19/2779
- Spark plugs
auto, 4/469; 10/1433; 13/1913; 16/2461
boat, 2/312; 7/965; 17/2560
cause of radio interference, 7/965
chain-saw maintenance, 11/1640
cleaning, 7/1003
electronic ignition system, 1/153; 10/1435
fouled, 4/469
outboard motor, 7/960; 12/1772
replacing, 13/1913; 19/2921
spare, in boat tool kit, 7/974
trouble-shooting, 12/1772; 16/2461
Wankel rotary engine, 19/2921
- Spar varnish, 6/805; 8/1109
for natural wood finish, 12/1839
- Speaker output, of tone and chord generator, 18/2745
- Speakers
in bookshelves, 17/2505
for car stereo, 17/2501, 2503
coaxial, 15/2287
choosing, 17/2499
directional microphone, 11/1663
in end tables, 17/2511
in grandfather's clock, 4/597
high fidelity, 9/1355; 17/2518
nine-unit, 17/2471
stereo, 17/2471, 2499, 2501, 2505, 2511
- Spearfishing scuba diving, 16/2320
- Spear-point tool, lathe, 11/1549
- Special-purpose tools, types, 9/1321
- Specimen illuminator, opaque, 13/1992
- Specimen table, in macrophotography, 11/1623
- Spectrum
electronic, 5/647
radio, 7/951
- Speech, scrambled, decoding, 18/2668
- Speed
boat, trolling for fish, 19/2889
of driving, factor in boat trailer choice, 19/2814
- Speedometer, for boat, 3/333
- Sphagnum moss, in plant propagation, 8/1143
- Spherical aberration, in binoculars, 2/267
- Spice racks, 17/2478
- Spindle, headstock, lathe, 11/1547
- Spirit level, to check oven, 7/931
- Spit, cooking, 5/709
- Splash action, in dishwasher, 6/793
- Splash shield, caliper, 6/787
- Splices, tying, 10/1516
- Splicing of electric wires, 17/2482
- Spine, reed, for cane seat, 8/1206
- Spines, strengthen joints, 10/1412
- Splitting in plywood, 2/282
- Split-wiring, in remote control switching, 14/2139
- Spokes, wheel, servicing, 2/261
- Spokeshave, rounding edges, 4/488
- Spotted bass, identifying, 8/1101
- Spotlights, auto 6/913
- Spot putty, auto retouching, 14/2155
- Spot removal
auto upholstery, 19/2928
floors, 17/2484
rugs and carpets, 17/2484
wood floors, 8/1106
- Spray adhesives, flexible, 1/44
- Spray gun
in antiquing, 1/124
auto painting, 12/1819
choosing, 14/2161
house painting, 12/1837
Spray painting, 14/2156
technique of, 14/2160
- Spring pole partitions, 13/1900
- Springs
auto, 16/2375
garage-door balance system, 8/1222
- Sprinklers, water, for garden, 9/1249
- Spruce, for paddleboard, 2/308
- Spume lines, in boating, 12/1731
- Squall lines, in weather forecasting, 20/3058
- Square knot, 10/1517
- Squares, types of, 9/1316
- Squash, vegetable garden, 9/1242
- Squeel circuit, for CB radio, 4/593
- Squirrels, camp intruders, 20/3079
- Stabilizers, home video, 20/2978
- Stage, mechanical, 13/1973
- Staggered splice, in electrical wiring, 17/2482
- Stain
alcohol-base, 6/908
exterior house painting, 12/1839
in furniture refinishing, 7/1060

- oil, for wood floors, 8/1109
- removal, 17/2485; 19/2931
- in wood finishing, 7/1067; 19/2925
- Staining wood
 - preparation for, 17/2480; 19/2925
 - technique of, 17/2488
- Stainless steel
 - alloy, for knives, 10/1504
 - kitchen counter, 20/3004
- Staircase
 - food storage unit under, 17/2534
 - to new second story, 15/2164
 - spiral, 1/34
- Stairs, wrought iron railing, 14/2118
- Staking, flowers and vegetables, 9/1240
- Stalling, of auto engine, 4/469
- Stall speed, ultralight aircraft, 1/65
- Staple gun
 - for ceiling tiles, 4/518, 524
 - how to use, 17/2494
 - in running wire, 6/819
 - for screening, 3/354
 - for upholstering chair seat, 8/1205
 - for wire-mesh doors, 5/763
- Staplers, types of, 9/1320
- Star drill, 6/820
- Stars, telling time by, 6/784
- Starter
 - auto reviving, 7/989
 - fluorescent light, 8/1134
- Star wheel brakes, 6/877
- Static
 - in boat radio, 7/960
 - convergence, color TV, 5/637
 - radio, as weather warning, 20/3061
 - wireless intercom system, 10/1465
- Stator, alternator, 1/85
- Staved construction, 10/1412, 1455
- Steamer, for removing wall coverings, 20/2994
- Steel
 - in bearings, 2/231
 - of gaskets, 7/983
 - for knives, 10/1504
 - for lathe bed, 11/1547
 - reinforcing rods, masonry, 17/2522
 - stainless, 10/1500; 21/3104
 - stoves, wood-burning, 17/2581
- Steel-belted radial tires, 18/2727
- Steel wool
 - as abrasive, 1/28, 2/273
 - as decoupage polisher, 5/750
 - in furniture refinishing, 7/1057
 - iron soleplate cleaning, 10/1473
 - in smoothing pipes, 7/1034
 - in wood finishing, 7/1071
- Steering characteristics, of large boat, 3/315
- Steering system
 - auto, 14/2048
 - boat, cleaning for spring, 11/1632
 - ultralight aircraft, 1/69
- Stem
 - in boat building, 2/288
 - faucet, removal of, 7/1028
 - in Sea Angler, 2/306
- Step flashing, 6/836
- Steeper, water skiing, 20/3046
- Stepping-stones
 - concrete, 5/679
 - of pebbles, 3/369
- Steps
 - brick, 3/360
 - forms for concrete, 11/1646
 - for mobile home, 11/1690
 - precast concrete, 11/1650
- Stereo
 - bookshelf speakers, 17/2505
 - car, equipment for, 17/2501
 - end table speakers, 17/2511
 - extension speaker for outdoor high-fidelity system, 17/2518
 - home, choosing equipment for, 17/2497
 - nine-unit speaker, 17/2471
 - Stereo microscope, 13/1973
- Stereophonic cassette player, 4/506
- Sterilization, used goods, 8/1199
- Stiles
 - cabinet doors, 6/851
 - door, painting, 6/830
- Stings, insect, 13/1931
- Stippling
 - effect of paint, 12/1853
 - in wood carving, 4/498, 502
- Stone
 - as aggregate, 5/657
 - building with, 17/2521
 - crushed, 5/657; 10/1540
 - for fences, 7/1037
 - floors, stain removal, 17/2485
 - foyer, installing, 8/1144
 - as house siding, 16/2427
 - imitation wall covering, 20/3002
 - for kitchen wall, 20/3007
 - laying, 5/657
 - as mulch, 10/1540
 - synthetic, 2/207
- Stonework
 - curbs, edging, and ground cover, installing, 17/2525
 - material and techniques, 17/2521
 - retaining walls, 17/2527
- Stop cuts, wood carving, 4/495, 502
- Stopper ball in toilet flush tank, 18/2738
- Stopper knot 10/1517
- Storage
 - in attic remodeling, 1/141
 - boat, 17/2553, 2559
 - boat lines, 11/1635
 - bulbs and plants, 9/1246
 - in carport, 10/1402
 - cooking appliances, hatch, 17/2537
 - extra lumber, 11/1611
 - extra space in closets, 4/608
 - fence, 7/1042
 - folding bed, 17/2531
 - food, 17/2534
 - guns and ammunition, 6/801
 - outboard motor, 12/1776
 - outdoor, in wishing well, 12/1759
 - plan for, 10/1404, 1536
 - port for boat, 17/2553
 - in room divider, 15/2192; 17/2541
 - sheds, 7/1042; 10/1404
 - for sporting goods, 17/2564
 - units, 17/2531, 2534
- Storage space
 - in darkroom, 5/717
 - in entertainment center, 8/1170
 - in garage conversion, 8/1230
 - little red barn as, 9/1280
 - for tools, 9/1302
 - for trailer, 3/402
 - in workbench, 21/3174
- Storage wall
 - free-standing, 17/2572
- Storm doors
 - acrylic, 17/2577
 - paint like wood, 12/1841
- Storms
 - clues to, in boating, 12/1732
 - electrical, on camping trip, 3/426
- Storm/screen doors, care of, 21/3107
- Storm windows
 - acrylic, 17/2577
 - aluminum, 1/90
 - as insulation, 9/1329
 - paint like wood, 12/1841
 - summer cooling, 5/681
- Stove
 - for camping, 3/414
 - electric, repair of, 7/931
 - tin can, for camping, 5/710
 - wood-burning 17/2581
- Strapwork, wood carving, 4/498, 501
- Strawberries, wild, 12/1790
- Strikeboard, in masonry, 3/363
- Striking off, of concrete, 5/659
- Striped bass, identifying, 8/1104
- Strip heater, for bending acrylic sheet, 14/2012
- Strobe attachments, camera, 13/1950
- Strobe unit, mechanical, 17/2587
- Stropping, in sharpening blades, 16/2343, 2351
- Stucco
 - cement, colored, 17/2597
 - as house siding, 16/2427
 - interior, for patching, 13/1916
 - patching, 11/1654
 - repairing, 17/2597
- Syrofoam
 - insulating board, 2/186; 10/1395
 - sheeting, child's raft, 14/2113
- Subflooring
 - in garage conversion, 8/1233
 - in home addition, 9/1385
 - interior plywood for, 11/1601
 - for new second story, 15/2168
- Suction, bonding stucco, 17/2598
- Sump pump, 2/185
- Sun
 - in landscaping plan, 9/1269; 10/1533
 - locating true north by, 6/784
 - in patio design, 13/1919
- Sundek, in landscaping, 9/1264
- Sunfish, identifying, 8/1100
- Sun-sauna chaise, 4/548
- Superstructure, boat building, 2/293
- Surface signs, in folk navigation, 12/1730
- Surface-unit controls, of electric range, 7/934
- Surfboard
 - maintenance of, 17/2601
 - motorized, 15/2210
 - sailing, 2/294
- Survival
 - drown-proofing, 17/2610
 - emergency shelter, 17/2609
 - floating method, 15/2252
 - freeze-proofing, 17/2605
 - frostbite, avoiding, 17/2607
- Suspension, ball joints in, 2/161
- Suspension system, of garage doors, 8/1218
- Swan system paneling, 2/209
- Sweating
 - of pipe, 14/2024
- of toilet tank, 18/2741, 2743
- Swim, learning to, 17/2610
- Swimming
 - basic strokes, 17/2614
 - drown-proof, becoming, 17/2610
 - importance of, 15/2248
 - and quicksand, 14/2085
 - underwater, 17/2621
- Swimming pool
 - dressing room, little red barn as, 9/1280
 - drown-proof, make yourself, 17/2610
 - in landscaping plans, 10/1535
 - maintenance of, 18/2628
 - placement of, 18/2625
 - selecting, 18/2625
- Swing
 - of lathe, determining, 11/1547
 - lawn, 8/1191
- Switch
 - AC/DC radio, defective, 9/1356
 - auto horn, 6/919
 - of blender, 2/276
 - boat starter, 7/974
 - breakaway, for trailer, 19/2810
 - burglar alarm control, 1/73
 - clutch, in auto, 7/990
 - combination electric, 20/3010
 - cut-off, for power tools, 18/2647
 - dishwasher timer, 6/800
 - electric control, 6/926
 - electric, dimmer, 6/777
 - electric mixer, defective, 11/1675
 - electric range surface unit, 7/934
 - electromagnetic, auto starter, 7/990
 - electronic burglar alarm, 1/84
 - garage and attic light, 20/3013
 - for garden lighting system, 11/1584
 - key, auto starter, 7/992
 - limit, in trash compactor, 19/2859
 - low-voltage system, 21/3120

master, in remote control, 14/2139
 microwave oven door, 7/946
 neutral safety, in auto, 7/990
 overload, refrigerator, 14/2122
 power, for tone and chord generator, 18/2747
 remote control, 14/2138; 20/3015
 for security sensor, 10/1407
 service-normal, on color television, 5/646
 single-pole dimmers, 6/778
 three-way, 20/3014
 two-level electric, 6/777
 vacuum cleaner, checking, 20/2935
 walkie-talkie, 20/2981
 Switch and receptacle combinations, 20/3013
 Switch box, electric, 4/584
 Switch transfer linkage, in cassette player, 4/508
 Synchronization of breaker points, in outboard motor, 7/960
 Synchronizing signal, TV, 18/2673
 Sync stability control, TV, 18/2684

T

Tables

book and magazine, 18/2641
 bookshelf-table, 3/339
 bumper pool, 14/2042
 butler's tray table, 19/2865
 cabinet, made from crate, 11/1606
 of cast concrete, 5/675
 chessboard-topped, 8/1211
 coffee, 8/1168; 18/2634, 2638
 drop-leaf coffee, 18/2634
 end, for stereo speakers, 17/2511
 fold-away, 18/2641
 game, 8/1211
 kitchen, 10/1496
 Parsons, making, 13/1894
 patio, 8/1195
 picnic, 13/1997
 plastic laminates for, 10/1496
 pool, 14/2026
 tray, butler's, 19/2865
 Table saw
 for electric drill, 6/861
 how to use, 18/2647
 for hutch, 6/901
 for mounting hinges, 3/375
 molding head mounted on, 19/2804
 for plastic laminate, 10/1496
 for rabbeting, 4/561; 16/2332
 for room divider, 17/2541
 for stereo end tables, 17/2511
 for TV cabinet, 3/348
 twin-blade cutting with, 19/2788
 Tach-dwellmeter, 7/1005
 Tacking in sailing, 15/2256
 Tachometer
 boat, 3/333; 7/965
 carburetor, 4/474; 7/1005
 to measure auto rpm, 7/967
 radio interference, 7/965
 Tack cloth, auto painting, 12/1821
 Tags, color-keyed, 14/2018
 Tackle, fishing, 8/1096
 Tailgate extension, van, 3/406
 Taillights
 auto, 6/913
 boat trailer, 19/2827
 trailer, 3/326
 Tail pipe, auto, 7/1009
 Tailstock, of lathe, 11/1547
 Tang
 chain drive, in chain saw, 11/1638
 of knife, 10/1503
 Tang chisel, 4/569
 Tank
 for portable shower, 16/2416
 water, vacation house, 16/2438
 Tape
 cassette, 18/2661
 conductive, in remote control system, 20/3016

eight-track cartridge, 18/2661
 in home video, 20/2974
 recorded, trailering tips, 19/2812
 Tape drive assembly, repairing in cassette player, 4/509
 Tape head
 car tape player, 4/511
 cassette player, 4/506
 Taper cut, wood-turning, 11/1554
 Tape recorder
 directional microphone, 11/1663
 repairing, 18/2656
 Tapering jig, for table saw, 10/1478; 18/2651
 Tapper, in bottle cutting, 3/351
 Tappet cover, gasket, weak spot in, 12/1744
 Tappets, auto engine, servicing, 7/994
 Tap splice, for electrical wiring, 17/2483; 21/3136
 Tar
 roofing, 15/2188
 stains, removal of, 19/2932
 Targets
 clay, practice on, 10/1422, 1429
 gun, artificial, 16/2389
 portable, shooting range, 16/2387
 Tarps, camping accessory, 3/424
 Tautline hitch, 10/1518
 Telephone
 bench, 5/725
 burglar alarm, 1/71, 74
 privacy device, 18/2665
 Telescoping
 travel trailer, 3/398
 truck camper, 3/400
 Television
 adjustments of, 5/631; 9/1355;
 18/2676
 antenna, rooftop, 1/104
 cabinet-bookcase, 3/348
 color, 5/631, 641
 computer display, 5/654
 interference by jet planes, 12/1736
 photographing scenes from, 13/1955
 portable, 15/2192; 18/2689
 repairing, 9/1355; 18/2671, 2689
 from satellite signals, 1/110
 tube replacement, 5/641
 Tempera, for wall plaque, 5/703
 Temperature
 for boat painting, 11/1628
 of camp pit fire, 12/1797
 change, weather forecast, 20/3059
 of dishwasher water, 6/793
 fluorescent-light gardening, 8/1142
 in frequency variation, 7/957
 gauge, auto, 6/916
 range, of spark plugs, 16/2464
 reduction in home, 5/680
 refrigerator maintenance, 14/2121
 stability, home, 9/1328
 Tempering steel, 4/499, 501
 Template
 box, with portable router, 15/2202
 duplicate shapes on lathe, 11/1559
 for electronic burglar alarm, 1/81
 to guide router, 14/2062
 for picture frames, 13/2005
 Tenoning jig, table saw, 10/1478
 Tenons, installation/repair, 6/840
 Tension adjustment, of garage-door springs, 8/1221
 Ten-speed bicycle, servicing, 2/259
 Tent
 cooking in, 17/2605
 how to lash, 3/440
 how to pitch, 18/2701
 lightweight, in back pack, 9/1364;
 17/2609
 making, 18/2707
 repair and maintenance of, 18/2709
 shielding from wind, 17/2605
 staking out, 3/415
 for tailgate van extension, 3/406
 windproofing, 18/2706
 Tent trailer, trunk for, 19/2832
 Terminals, electric
 fluorescent lights, 8/1134

radio tube socket, 9/1356
 stove heater element, 7/934
 wiring, 6/912
 Termites, 9/1288
 Test light
 auto valve adjustment, 20/2955
 boat tool kit, 7/974
 clothes dryer repair, 20/3034
 electrical appliances, 7/933
 fluorescent light, 8/1135
 vacuum cleaner, 20/2935
 Test patterns, TV adjustment, 18/2681
 Textures, for concrete, 5/659
 Thermistor resistor, television repair, 18/2692
 Thermometer
 as camping necessity, 3/428
 oven, 7/936
 Thermoplastic adhesives, 1/44
 Thermosetting adhesives, 1/44
 Thermostat
 in air conditioner, 1/54
 auto radiator, 5/684
 clothes dryer, 20/3028
 coffee making, 5/625
 electric iron, 10/1473
 electric oven temperature, 7/936
 electric range surface unit, 7/937
 hot-air gas furnace, 9/1330
 individual, electric heating, 8/1158
 refrigerator, 14/2122
 Thermostat housing gasket, 7/986
 Thermostatic air cleaner, 1/116
 Thermostatic coil
 automatic choke, 4/578
 in carburetor, 4/483
 Thermostatic controls, auto, 7/1007
 Three-dimensional photography, 13/1972
 Throttle adjusting screw, carburetor, 4/474
 Throttle operation, fuel for, 4/480
 Tie-tac-toe, three-dimensional, 8/1208
 Tide
 effect in boat handling, 6/807
 study, for fishing, 8/1097
 Tile
 acoustic, 12/1742
 asphalt, 5/720
 bathroom, 2/194
 carpet, 18/2715
 ceiling, 4/517, 521; 12/1742;
 17/2495
 ceramic, 2/174, 194; 18/2719
 countertop, 4/537
 fireplace, 18/2719
 floor, 4/522; 8/1112, 1116; 10/1405
 installation, 2/194, 200; 4/517, 521;
 17/2495; 18/2715
 mosaic, for shaving bar, 2/171
 for new home, 10/1405
 plastic, kitchen walls, 20/3007
 removing stains from, 17/2485
 roofing, 15/2175
 self-adhesive, 8/1116
 shaving bar, 2/174
 sound transmission muffler, 4/522
 vinyl-asbestos, 8/1116
 wall, plasterboard base, 20/2992
 waxing, 8/1112
 Tilt-bed trailer, launching, 3/326
 Time, determining by stars, 6/784
 Timer
 automatic, 7/934; 8/1141; 11/1584;
 12/1769
 clothes dryer, 20/3028
 defrost, 14/2125
 dishwasher, 6/793
 for electric range controls, 7/934
 for fluorescent gardening, 8/1141
 for garden lighting, 11/1584
 for lawn lampost, 12/1769
 toaster, 18/2733
 washing machine, 20/3021
 Timing
 in boat engine, 2/314
 ignition, 10/1434; 13/1905; 19/2915

- light to test spark plugs, 7/967
 setting, auto ignition, 19/2915
 testing auto, 4/469
 of Wankel distributor, 19/2921
 Timing controls, care of, 7/1000
- Tires**
 auto, 18/2725, 2729, 2731
 bicycle, 2/263
 boat trailer, checking 19/2826
 buying and maintaining 18/2725
 minibike, 11/1652
 pressure in, 19/2811
 rotating, 18/2731
 trailer camper, 3/402; 19/2811
 winter, 18/2729
 Tissue, dispenser for, 13/1891
 Toaster, repairing, 18/2733
- Toilet**
 clogged drain, 6/845
 flush tank repair, 18/2738
 tank, sweating of, 18/2743
- Tomatoes**
 fertilizer for, 7/1049
 for vegetable garden, 9/1242
 Tone and chord generator, 18/2745
- Tongue-and-groove**
 boards, as sheathing, 6/834
 ceiling tiles, 4/518, 526
 column assembly, 10/1412
 house siding, 16/2427
 van paneling, 20/2960
 Tool caddies, 18/2750, 2753
 Tool chest, 18/2760
- Tools**
 automatic transmission, 19/2847
 bicycle maintenance, 2/260
 building with stone, 17/2521
 campfire building, 3/408
 care of, 4/572; 9/1241; 12/1838;
 18/2764
 carving, for model building, 4/572
 ceramic tiling, 2/195
 check list of, 9/1299
 chests for, 18/2760
 front-wheel drive servicing, 1/151
 garden, 9/1241, 1280; 19/2779
 hand, 9/1298; 18/2764
 maintenance for camping, 3/443
 for masonry, 3/355, 360; 5/663
 painting, 12/1838
 plumbing, 14/2019
 power: See Power tools
 renting, 9/1301
 selecting, 9/1298; 14/2052; 19/2779
 sharpening, 16/2341, 2346, 2352
 storage of, 9/1280, 1302; 18/2764
 tile-setting, 18/2720
 types of, 9/1298
 wallpaper hanging, 20/2997
 wood, for camping, 5/710
 wood-turning, 11/1449
 Tool techniques, 6/856, 863, 869
 decorative cuts with common shop
 tools, 9/1301
 jointing with wood shapers, 19/2797
 shaping and cutting large work-
 pieces, 19/2804
 twin-blade cutting with table saw,
 19/2788
 Topsoil, for new lawn, 11/1575
 Torque converter, minibike, 11/1670
 Torque, defined, 9/1324
 Torque wrench, 5/690; 6/789; 7/986,
 1003; 9/1324; 16/2377, 2470;
 20/2952, 2953
- Torsion spring garage-door balance**,
 8/1224
- Touch-hold generator**, 15/2282
- Touchpaper**
 air cannon, 15/2280
 smoke box optical bench, 15/2310
 Tourniquet, in emergency, 8/1091
 Tourniquet-and-cryotherapy, for
 snakebite, 16/2452
 Tourniquet-cutting-suction, for
 snakebite, 16/2452
- Towels**, paper, dispenser, 13/1891
- Towing**
 camper trailer, 3/397
 disabled boat, 15/2238
 trailer, tips for, 19/2810
 Towline, for waterskiing trucks,
 20/3043
- Toys**
 battery for, 2/219
 flashing, 5/706
 Track, hideaway, model car, 11/1694
 Trailbike 11/1670
- Trailer**
 bearings, 3/326; 19/2811
 boat carrying, 3/323; 17/2559;
 19/2810, 2814, 2821, 2827
 camping, 3/396, 416, 445; 12/1782
 check list for, 3/419
 dimensions of, record, 19/2812
 facilities of, 3/402
 fifth wheel, 3/399, 404; 19/2809
 greasing wheel bearings, 19/2811
 hitch, choosing, 19/2807
 lights for, 19/2827
 loading boat onto, 3/327
 maintenance of, 3/445; 19/2821
 tent, trunk for, 19/2832
 tire size, 19/2814
 towing tips, 19/2810, 2829
 travel, 3/398, 402, 419; 19/2810,
 2829
 types, 3/397
 Training boat, 19/2837
- Transceiver**
 CB radio, 4/590
 for optical communication, 5/647
- Transformer**
 electric, 6/926
 electric range, 7/941
 garden lighting system, 11/1583
 gas furnace, 9/1337
 intercom system, 10/1470
 power, in radio, 9/1359; 15/2287
 remote control switching, 14/2138;
 20/3017
 restoring clock radio, 14/2110
 step-down, 6/815, 822
- Transistor**
 amplifier, for LED, 5/647
 crystal oscillators, built with,
 7/959
 power output, tape player, 4/511
 test, cassette player, 4/508
 walkie-talkie, checking, 20/2983
- Transmission**
 auto, replacing, 13/1913
 automatic, 4/474, 615; 7/990;
 12/1744; 19/2847
 impact, 4/522
 minibike, 11/1669
 servicing, 19/2847
 of sound, 4/521
 vacuum modulator, 12/1744
 voice, by laser beam, 10/1546
- Transmission pan**, gasket for, 7/986
- Transmitters**
 CB radio, 4/591; 7/954
 crystal filters in, 7/954
 radio, garage-door operator, 8/1227
- Trap**
 bullet, in shooting range, 16/2386
 drain, 6/844
 fixture, 14/2020
 sink, 6/843
- Travel trailer**, 3/398
 checking facilities, 3/402
 check list for, 3/419
 towing, 19/2810
 towing along with boat, 19/2829
- Transhooting**, setup for, 16/2387
- Trash compactor** repair, 19/2853
- Trays**, 19/2860, 2865
- Tread squirm**, auto tires, 18/2726
- Trees**
 bonsai, 3/334
 care of, 19/2875
 in landscaping, 10/1406
 pruning in fall, 9/1247
 selection of, 19/2872
 shade, 5/682; 9/1247; 10/1406;
 19/2872
 summer cooling of home, 5/682
- transplanting, 19/2879
 watering, 9/1248, 1250
 weather indicators, 20/3066
 winter protection for, 9/1246
 Tricks, water skiing, 20/3038, 3054
 Triggering systems, for paint spray-
 ers, 14/2157
- Trim**
 carved, 3/392
 contrasting color, 12/1853
 exterior house painting, 12/1840
 home addition, 9/1392
 interior, 9/1392; 12/1853
 lumber for, 11/1595
 removal, auto painting, 12/1819
 restoring used furniture, 8/1203
 tiles, 4/544, 546
 Trimming, plastic laminates, 10/1498
- Tripod**
 directional microphone, 11/1662
 parabolic microphone, 11/1667
 Trolling techniques, 8/1098; 19/2885,
 2891
- Trouble light**, as electric safety test,
 21/3120
- Trout**, fishing for, 19/2893
- Trowels**
 gardening, 19/2781
 notched, 2/195
 types of, 9/1320; 19/2781
- Truck camper**, 3/396
- Tub**, in laundry area, 11/1566
- Tubes**
 AC/DC radio, defective, 9/1355
 checking, 18/2671
 color television, changing of,
 5/641
 oscillator, 18/2673, 2676
 picture, 9/1362
 repairing TV, 18/2693
 television, 5/641; 9/1362; 18/2671,
 2673, 2693
- Tubing**
 aluminum, 7/1015, 1020
 bearing support, anemometer,
 21/3091
- Tuck dive swimming**, 17/2622
- Tucked sheet bend knot**, 10/1511
- Tuckpointing**, mortar for, 11/1656
- Tulips**, 8/1124, 1126; 9/1261
- Tuner**
 in stereo equipment, 17/2498
 in television repair, 18/2695
- Tune-up**, engine
 piston, 4/469; 6/890; 19/2902
 Wankel, 19/2918
- Turtle knot**, 10/1511
- Turnaround**, water skiing, 20/3045
- Turnings**
 inlaid, 10/1452
 lathe, 11/1547
 ready-made, 8/1166
 wood, 10/1413; 11/1547
- Turntables**, stereo, 17/2497
- Turpentine**
 furniture refinishing, 7/1058
 in wood finishing, 7/1067
- Tweeter**
 bookshelf speakers, 17/2505
 hi-fi unit, 15/2287
 nine-unit stereo speaker, 17/2471
- Twin-blade cutting**, table saw,
 19/2788
- Twin-screw boat**, 3/315

U

- Ultralight aircraft, 1/64
 Ultrasonic burglar alarm, 1/71
 Ultraviolet component for plants, in
 fluorescent light, 8/1141
 Under-bed unit, for model car track
 layout, 11/1697
 Undercoating, in antiquing, 1/123
 Underground sewage drains, 6/847
 Underhood lights, auto, 6/913
 Underlayment, ceramic tiling, 2/198
 Under-pillow speaker, 15/2289
 Undertow, swimming hazard, 15/2250

Underwriters' knot, in wire splicing, 21/3126
 Underwriters Laboratories (UL), 1/55; 6/779; 7/1074; 10/1519;
 15/2178; 21/3122
 Unfinished furniture, finishing, 19/2925
 Unglazed tiles, 18/2719
 Unicycle, 2/250
 United States
 Coast and Geodetic Survey, 12/1716; 19/2886
 Coast Guard, 12/1712
 Coast Guard Auxiliary, 3/320
 Department of Agriculture, 8/1127
 Geological Survey, 14/2084
 Light Lists, 12/1720
 Power Squadrons, 3/320; 6/814
 Public Health Service, 9/1240
 Universal wheel puller, 6/879
 Upholstery, auto, 19/2928
 Urea formaldehyde glue, 1/44
 Ureaform fertilizers, 11/1578
 nitrogen, 7/1049
 Urea glue, wall panels, 13/1869
 Urethane foam, insulator, 9/1329
 Used lumber, 11/1600

V

Vacation home water supply, 16/2437
 Vacuum brake booster units, power brakes, 6/887
 Vacuum cleaner
 chimney cleaning, 4/560
 fireplace ashes, 7/1073
 refinishing wood floors, 8/1106
 repair, 20/2933
 spray gun attachment, 14/2156
 swimming pool, 18/2627
 wood finishing, 17/2490
 workshop, 14/2054
 Vacuum coffee maker, 5/630
 Vacuum diaphragm, Wankel, 19/2919
 Vacuum gauge, 4/474
 auto trouble-shooting, 20/2937
 carburetor adjustment, 13/1905
 checking auto engine, 7/1003
 Vacuum intake manifold, 7/1004
 Vacuum modulator, in automatic transmission, 12/1744; 19/2847
 Vacuum override, air cleaner, 1/46
 Vacuum piston, 4/480
 Vacuum pump, diaphragm, checking for oil leakage, 12/1745
 Valve assembly, in hydraulic brakes, 10/1431
 Valve compound, in sharpening electric razor, 16/2358
 Valve guides, worn, 12/1743
 Valve lifters, hydraulic, 7/994
 Valve stem seals, damaged, 12/1743
 Valves
 adjustment, 7/1007; 20/2953
 auto engine, 7/994, 1007; 20/2943, 2953
 bathroom, 14/2018
 carbon buildup on, 7/1013
 carburetor, 4/472, 480
 choke, 4/479
 dishwasher fill, 6/800
 flush, in toilet, 18/2738
 globe, 7/1030; 14/2025
 inlet, 6/797; 18/2740
 manifold heat control, 7/1007; 9/1347
 PVC, clogged, 12/1744
 radiator, heating system, 9/1343
 radiator cap, auto, 5/684
 repairing, 7/1030; 14/2025
 residual pressure check, 6/787
 servicing auto engine, 20/2943
 shutoff, 7/1027; 14/2018
 sink, installing, 7/1030
 sticking auto engine, 7/994
 sweating toilet tank, 18/2743
 vacuum check, 6/890
 washing machine fill, 20/3021

Vanity mirror, 20/2957
 Vans, how to custom-convert, 20/2960
 Vapor barrier
 against frostbite, 17/2607
 in insulated areas, 9/1329; 10/1394
 for sauna bath, 15/2270
 Variable displacement engines, 1/157
 Varnish
 finish for stained wood, 17/2489
 removal, 8/1106; 16/2458
 sanding, 15/2262
 stains, 17/2480
 wood finish, 7/1060, 1072; 19/2925
 wood floor finish, 8/1109
 Vee chisel, 4/497, 502
 Vegetable garden, 9/1242
 in landscaping plan, 9/1264
 Veiner, in linoleum printing, 14/2067
 Veining
 with electric drill, 6/860
 with portable router, 15/2199
 Veneering saw, inlay work, 10/1458
 Veneer pictures, inlaid, 10/1446
 Veneer press, 3/390
 Veneers
 face, of plywood, 11/1601
 finishing plywood edges, 21/3148
 inlaid, 10/1458
 Vent
 carburetor, spring-loaded, 4/474
 oven, 7/932
 Ventilation
 basement, 2/182; 11/1655
 bathroom, 20/2965
 boat, 3/322
 cross, in added rooms, 9/1377
 darkroom, 5/720
 by fans, 20/2965
 fiberglass-roofed patio, 13/1882
 fluorescent-light gardening, 8/1142
 gable roof, 5/714
 heated tent, 17/2606
 kitchen, 10/1484; 20/2965
 overhead projector, 14/2070
 sauna bath, 15/2267
 use of carburetor solvent, 4/477
 ventilator, gable, 6/834
 venting, hot-water radiators, 9/1342
 vent tubes, in carburetors, 4/480
 Venturi assembly
 in carburetor, 4/479
 in Wankel engine, 19/2919
 Vermiculite
 in concrete mix, 5/675
 as soil conditioner, 11/1575
 Vertical hold, TV, 5/633, 645;
 18/2676, 2686
 Video
 cassette recorders, 20/2974
 home equipment, 20/2974
 Videodisc players, 20/2976
 viewer, stereoscopic, 13/1973
 Vinyl
 asbestos tile, 10/1405
 auto upholstery, 19/2928
 bonding additive, 5/663
 caulking compounds, 4/514
 fabric, for kitchen walls, 20/3007
 kitchen counter, 20/3004
 laminated, 12/1817
 latex emulsion, concrete repair, 5/663
 liquid laminate, antiquing, 5/767
 paint for boat hull, 11/1630
 plastic house siding, 16/2427
 strips, microwave oven, 7/946
 Violas, 8/1132
 Vise
 fly-tying, 2/189
 types, 9/1318
 workbench, 21/3177
 Voice-coil, loudspeaker, 15/2286
 Voice transmission, by laser beams, 10/1542
 Voltage
 battery, 2/214
 circuit, fluorescent light, 8/1135

of Cyclops alarm, 1/82, 84
 defined, 6/926
 divider, anemometer, 21/3088
 electric range, 7/931
 laser power pack, 10/1543
 quartz crystal, generated, 7/953
 television, 18/2673
 vacuum-tube oscillator, 7/958
 Voltage-doubler circuit, 18/2691
 Voltage regulator
 auto, replacement, 13/1906
 Cyclops alarm, 1/80
 in outboard motor, 7/964
 Voltmeter
 alternator test, auto, 1/88
 defined, 6/922
 electrical system, auto, 7/967
 regulator, auto, 6/916
 stove surface units, checking, 7/934
 TV tubes, checking, 18/2693
 Volt-ohmmeter, 2/276
 cassette player repair, 4/506
 clothes dryer repair, 20/3034
 Volt-ohm-milliammeter (VOM), 9/1355
 Volume
 fading, AC/DC radio, 9/1358
 fuel pump, testing, 8/1149
 control, for door chimes, 6/820

W

Wagon-wheel gear, 9/1374
 Walkie-talkie
 citizen's band, 4/589; 7/951
 repair, 20/2980
 Walks
 brick, 3/360
 concrete, 11/1643
 Wall
 exterior, boat storage port, 17/2555
 storage, free-standing, 17/2572
 tiling preparation, 4/541
 Wallboard
 over basement insulation, 2/186
 fireplace tile base, 18/2720
 installing, 20/2984
 paneling, insulated, 13/1880
 repairing, 13/1918
 sanding, 15/2261
 Wall coverings
 attic remodeling, 1/140
 how to hang, 20/2996
 imitation stone, 20/3002
 paneling, 1/33; 2/204
 preparing for papering, 20/2993
 replaced, 20/3001
 removing, 20/2993
 Wall decorations, 5/701; 20/3004;
 21/3205
 Wall oven, 10/1403
 Wall paneling, 10/1402
 Wallpaper
 estimating quantity needed, 20/2996
 hanging, 20/2996
 for kitchen walls, 20/3007
 preparing walls for, 20/2993
 Wall rack, for storing lumber, 11/1612
 Wall scraper, 9/1309
 Walls
 basement, 2/181
 brick, 3/360
 brick-veneered, dampness, 11/1655
 ceramic tiling of, 2/194
 concrete, garden, 11/1651
 cut stone, 17/2521
 exterior, 9/1329; 11/1574, 1651;
 15/2169; 17/2521, 2527
 formed, 17/2524
 framing, 15/2169
 insulation, 9/1329
 interior, 10/1404, 1405, 1488;
 11/1655; 12/1735; 13/1855, 1863,
 1914; 20/2993, 2996, 3002
 lawn planning, 11/1574
 paneling, 13/1855, 1863
 papering, 20/2993, 2996

- plaster, patching, 13/1914
- plastic, for bath, 2/204
- prefinished, 10/1405
- retaining, 11/1574; 17/2527
- rock veneer, 17/2524
- rubble, 17/2523
- sound-absorbent, 10/1488
- soundproof, 12/1735
- storage, 10/1404
- Wall shelves, Georgian, 16/2365
- Wall switches
 - combination electrical, 20/3010
 - surface-mounted, 20/3015
- Walnuts, wild, 12/1790
- Wankel engine
 - mini, 15/2196
 - tuning up, 19/2918
- Warm-air heating system, 8/1152
- Warranty
- microwave oven, 7/947
- mobile home, 11/1678, 1687
- Washer
 - faucet, 7/1027, 14/2021, 2024
 - loose, in noise, 14/2024
 - toilet valve, replacing, 18/2742
 - types of, 7/1028
- Washerless faucet, 7/1032
- Washing machine
 - portable, 11/1565
 - repairing, 20/3018
- Waste disposal system, 16/2439
- Water
 - camping, 8/1089; 9/1364
 - color of, in boating, 12/1730
 - for dishwasher, 6/791
 - facilities for darkroom, 5/718
 - fluorescent-light gardening, 8/1142
 - hard, in coffee making, 5/623
 - in landscaping plan, 10/1536
 - seepage through walls, 11/1654
 - supply, 8/1089; 9/1364; 16/2437; 20/3018
 - swimming pool, 18/2628
 - vacation home, 16/2437
 - washing machine, 20/3018
 - wood finishing stains, 17/2489
- Watercloset
 - clogged drain, 6/845
 - flush tank repair, 18/2738
- Watercress, wild, 12/1789
- Waterfowl
 - hunting, 10/1419, 1424; 14/2137
- Water heater
 - electric, 9/1340
 - swimming pool, 18/2626
- Watering systems, garden, 9/1249
- Waterlily tuber, as food, 12/1790
- Water-lily tulip, 8/1133
- Water pressure, dishwasher, 6/792
- Waterproofing, of basement, 2/180; 10/1406
- Water pump, auto cooling system, 5/691
- Water-repellent, for tent, 18/2713
- Water skiing
 - bare-foot, 20/3053
 - practicing on land, 20/3035
 - rating ability, 20/3038
 - slalom, how to, 20/3048
 - tricks, 20/3043
- Water valves, shutoff, 14/2018
- Water-watching, in boating, 12/1730
- Watt, defined, 6/923, 926
- Wattage
 - appliance, 6/927
 - dimmers, 6/781
 - microwave ovens, 7/944
 - water heater, 9/1340
- Watt-hours, defined, 6/923
- Watt meter
 - defined, 6/923
 - testing percolator thermostat, 5/625
- Waves
 - handling, 12/1732
 - river, 12/1733
- Wax
 - acrylic windows, 17/2580
 - auto, buffing, 15/2263
 - non-skid type, for stone floor, 8/1146
 - removers, 8/1112
 - stained wood, 17/2489
 - wood finish, 4/499; 7/1072
 - wood floors, 8/1109, 1112
 - wood-turnings, 11/1558
- Weather
 - as cause of car noises, 14/2142
 - forecasting, 20/3057
 - sealing house against, 4/513
 - study, for fishing, 8/1097
 - wind speed, measuring, 21/3087
- Weatherproofing, of fence, 7/1041
- Weather signs, how to read, 3/428
- Weatherstripping, 20/3069
 - for cedar closet doors, 4/613
 - door, 6/829; 21/3107
 - installing with staple gun, 17/2495
 - as means of cooling home, 5/681
- Weaving, on table-top loom, 11/1590
- Webbing
 - for back pack frame, 9/1366
 - cane, for chair seat, 8/1206
- Weekend projects
 - bookshelf-table, 3/339
 - brake shoes, replacing, 6/788
 - changing auto engine bearings, 2/230
 - dormer, 6/831
 - drop-leaf server, 16/2330
 - electronic equipment for, 7/966
 - fireplace installation, 7/1080
 - motorized surfboard, 15/2210
 - repairing worn ball joints, 2/161
 - skiff, 16/2442
 - spice racks, 17/2478
- Weep holes, retaining wall, 17/2530
- Welded hitch, for trailer, 19/2809
- Weldwood panels, 3/339
- Well, drilling, 16/2437
- Western exposure
 - in landscaping, 10/1534
 - in patio design, 13/1922
- Wet-or-dry coated abrasive, 1/27
- Wet-or-dry sandpaper, in glass cutting, 3/352
- Wet wall, stone, 17/2527
- Whatnot, 4/504; 13/1901
- Wheel bearings
 - servicing, 2/225, 261
 - tapered roller, 2/228
- trailer, greasing, 19/2811
- Wheel block, trailer, 3/328
- Wheel cylinders, auto, 10/1432
- Wheels, auto, balancing, 18/2730
- Wheels, bicycle, servicing, 2/261
- Wheels, for chef's cart, 4/487
- Wheels, for garden cart planter, 4/491
- Wheels, ultralight aircraft, 1/69
- Whetstone, 16/2346, 2352
- Whippings, tying, 10/1516
- White bass, identifying, 8/1103
- White crappie, identifying, 8/1103
- Whitefish, identifying, 8/1105
- White glue, 2/167, 3/342; 8/1210; 16/2337; 18/2640
- White oak, boatbuilding, 2/285, 306
- White pine
 - boat building, 2/286
 - decoys, 5/758
- Width control, TV picture, 18/2687
- Wilderness
 - craftsmanship, 5/709
 - direction finders, 6/782
 - foods, 12/1787
- Wild flowers, 20/3073
- Wildfowl hunting, 16/2411, 2414
- Wildlife
 - animal tracks, 20/3083; 3085
 - guide to animal intruders, 20/3077
- Winch
 - boat trailer, choosing, 19/2817
 - line, of boat trailer, 19/2823
- Wind
 - and boat handling, 6/807; 12/1732
 - and body warmth, 17/2604
 - camping hazard, 3/424, 429
 - and landscaping plan, 9/1270
 - prevailing, 12/1732; 20/3058
 - sailing, 15/2255
 - shelf, fireplace, 7/1074
 - speed, measuring, 21/3087
 - study, for fishing, 8/1097
 - weather indication, 20/3058
- Windbreak, trees for, 19/2873
- Windows
 - acrylic sheet, 17/2577
 - adding ledge and cornice, 9/1376
 - air conditioners for, 1/51
 - aluminum, 1/90
 - awning, screens for, 1/100
 - basement, 2/182
 - boat, 3/322
 - casement, 1/100; 21/3109
 - caulking, 4/513; 11/1657
 - cleaning, 17/2580
 - dormer, framing, 6/834
 - double-glazed, 9/1329; 10/1406; 21/3110
 - drafty, 20/3070
 - fan, 5/683
 - frames, 4/513; 10/1406
 - framing, 9/1386; 15/2169
 - in garage conversion, 8/1230
 - as insulation, 9/1329
 - kitchen, 10/1488
 - painting, 12/1832
 - plexiglass, 15/2210, 2221
 - rebuilt, 21/3104
 - repair, 21/3108
 - screens, 1/90; 16/2317
 - shutters, 16/2422
 - storm, 1/90; 5/681; 9/1329; 12/1841; 17/2577
 - warped, 21/3108
 - weatherstripping, 5/681; 9/1329
 - windmills, 21/3100
- Windshield, boat
 - plate glass for, 3/322
 - plexiglass for, 2/307
 - shatterproof, 3/330
- Wind speed indicator, for boat, 3/333
- Wine cellar and buffet, 21/3114
- Wine rack, acrylic sheet, 14/2009
- Winter protection map, antifreeze, 5/686
- Winter tires, for auto, 18/2729
- Wire
 - annealed hanger, 4/527
 - connectors, solderless, 21/3134
 - copper, for bonsai trees, 3/336
 - for door chimes, 6/818
 - electric, stripping, 21/3121
 - for electric appliance, 4/585
 - "magnet," 5/633
 - rubber-covered, doorbell, 6/822
 - snaking, 4/586; 6/818
 - splicing, 17/2482; 21/3131, 3134
 - 3-conductor, in chimes, 6/819
- Wiring, electrical, 6/920
 - adding a circuit, 4/584
 - air conditioner, 1/51
 - anemometer, 21/3097
 - appliance diagram symbols, 1/129
 - attic remodeling, 1/139
 - auto, 1/88; 6/911, 915, 920; 19/2916
 - blender, 2/276
 - boat, 2/314; 3/322; 7/974
 - and boat battery, 2/218
 - boat radio, static in, 7/960
 - boat trailer, 19/2823
 - clothes dryer, 20/3028
 - coffee maker, 5/626
 - combination switches, 20/3010
 - conductive tape for, 20/3016
 - darkroom, 5/720
 - dimmers, installing, 6/777
 - dishwasher, 6/798
 - doorbell installation, 6/822
 - door chimes, 6/815
 - extra room, 21/3129
 - fluorescent lights, trouble-shooting, 8/1134
 - garage conversion, 8/1230
 - garden lighting, 11/1582

in home addition, 9/1382
 in home remodeling, 1/33
 home security sensors, installation, 10/1407
 hot air gas furnace, 9/1336
 kitchen, 10/1486
 lamp post for lawn, 12/1765
 laundry center, 11/1572
 new home building, 10/1400
 new second story, 15/2164
 for overhead projector, 14/2076
 power tools, 14/2052
 range repair, 7/931
 refrigerator, 14/2125
 remote control switches, 14/2138
 rewiring lamps, 21/3126
 for rooftop antenna, 1/106
 safety guidelines in, 14/2052;
 21/3118
 safety wiring indicator, build, 21/3123
 splicing, 17/2482
 of steam or dry iron, 10/1475
 stereo speakers, 17/2474, 2509, 2520
 surface-mounted, 20/3015
 theatrical vanity mirror, 20/2957
 toaster, 18/2733
 understanding terms, 6/922
 workshop electrical supply, 21/3201
 Wishing well, 12/1759
Wood
 bending, 21/3139
 block, for sandpaper, 7/1063
 boat building, 2/281
 boxes, 10/1414, 1452; 19/2796
 campfire, 3/408, 410
 carving, 4/495, 501
 chisel, 4/570
 distressing, in decoupage, 5/750
 edges and end grains, finishing, 21/3145, 3147
 fences, 7/1037
 floors, 8/1106, 1110; 17/2485
 handcarving of, 4/495
 as heating fuel, 8/1085
 inlaid veneer pictures, 10/1446
 inlays, 10/1452, 1458
 kitchen walls, 20/3007
 ladders, 10/1519
 lumber, buying, 11/1595
 mulch, 12/1749
 painting, 12/1813
 painting with dyes, 12/1815
 preparing for finishing, 7/1062
 preservative, 14/2115
 rare, 3/390; 7/1067
 scrap lumber, antiquing, 11/1602
 sheathing, 9/1387
 shingles, 9/1390; 15/2180

soft, sanding, 15/2261
 staining and finishing, 7/1067;
 17/2480, 2488; 19/2925
 steaming, in bending, 21/3141
 stoves for burning, 17/2581
 turning, 10/1413, 1452
 Wood ashes, as barrier against slugs, 9/1240
 Wood board, as house siding, 16/2426
 Wood fiber, as insulator, 9/1329
 Wood grain
 boat building, 2/288; 3/321
 carving, 4/497
 cutting across, 4/573
 dye painting, 12/1815
 ends, finishing, 21/3145
 faking, 7/1070
 furniture refinishing, 7/1060
 inlaid veneer pictures, 10/1446
 panels, 2/180, 206; 13/1855
 raising, to sand smooth, 7/1064
 simulated, 1/125
 staves for effect, 10/1413
 Wood-holding qualities, nails, 12/1707
 Woodshapers, jointing with, 19/2797
 Wood-turning
 lathe, 11/1547
 methods of, 11/1550
 Woodworking, 6/863
 abrasives for, 1/25
 adhesives for, 1/39
 boring and routing with radial arm saw, 14/2099
 carving, 4/495
 columns, 10/1411
 dados, 21/3152
 decorative cuts, 19/2792
 edges and ends, finishing, 21/3145
 electric drills, 6/856
 handsaw, how to use, 15/2277
 hoppers, 10/1411
 joint, glued, 21/3157
 jointing, basics of, 21/3152
 jointing with wood shapers, 19/2797
 lathe, wood-turning, 11/1547
 machine molding of flat stock, 21/3167
 pad sander, how to use, 15/2259
 with portable router, 15/2198
 rabbeting, 21/3152
 refinishing equipment, 7/1057
 shaping and cutting large work-pieces, 19/2804
 sharpening tools for, 16/2346
 techniques of, 18/2647
 turnings, inlaid, 10/1452
 twin-blade cutting, 19/2788
 use of dowels in, 6/837

Woofers
 bookshelf speakers, 17/2505
 hi-fi unit, 15/2287
 nine-unit stereo speaker, 17/2471
 Wool clothing, as cold insulator, 17/2604
 Workbench
 build, 21/3174, 3182
 placement of, 21/3201
 Workshop
 check list of tools, 9/1299
 dampness, 9/1303
 desk combination, 21/3203
 lathe, 11/1547
 laying out, 21/3198
 little red barn, 9/1280
 sawhorse mini-, 18/2753
 Wow level, of recorded tape, 18/2662
Wrench
 Allen, 7/1029, 1033; 9/1302
 basin, in plumbing, 7/1033
 box, 13/1912
 box-end, 7/794; 16/2377
 end, 7/974; 14/2019
 monkey, 7/1027
 open-end, 4/472; 7/1003; 13/1912;
 16/2377
 pipe, 7/974; 14/2019
 ratchet, 8/1226
 reversible impact, garage door operator installation, 8/1226
 socket, 5/629; 7/996, 1003, 1030;
 13/1912; 16/2470
 torque, 2/229, 234; 5/690; 6/789;
 7/986, 1003; 9/1324; 16/2377,
 2470; 20/2952, 2953
 types of, 9/1315

Y

Yacht
 marine plywood for, 3/321
 twin-screw, 3/318
Yarn
 decorations, 21/3205
 wall plaque, 5/701
 Yellow bass, identifying, 8/1103
 Yellow perch, identifying, 8/1105
 Young Men's Christian Association, 16/2319

Z

Zero, quartz crystal, 7/954
 Zigzag course, sailing, 15/2256
 Zinc chloride battery, 2/223
 Zinc chromate, paint primer, 11/1628
 Zinnias, 8/1124; 9/1262
 Zonal heating-cooling systems, 1/54
 Zoysia grass, 9/1265; 11/1573

